THE LANCET

Offices: 7, ADAM STREET, ADELPHI, W.C.2.

Telegrams: LANCET, WESTRAND, LONDON. Telephone: TEMPLE BAR 7228 and 7229.

No. XVIII. OF VOL. I., 1931. LONDON, SATURDAY, MAY 2, 1931 Pp. 136—Price 1s.

No. 5618. Vol. CCXX. Founded 1823. PUBLISHED WEEKLY. Registered as a Newspaper. Annual Subscription Inland £2 2s. Abroad £2 10s.

OXFORD MEDICAL PUBLICATIONS.

SEE PAGE 2.

THIRD EDITION. With many Illustrations. 12s. 6d. net.

TREATMENT OF DISEASES OF THE SKIN.
By KNOWSLEY SIBLEY, M.A., M.D., B.Ch.(Camb.).
London: Edward Arnold & Co., 41 and 43, Maddox Street, W.

OESOPHAGEAL OBSTRUCTION:
ITS PATHOLOGY, DIAGNOSIS AND TREATMENT
(including four chapters on Cancer of the Œsophagus).
By A. LAWRENCE ABEL, M.S. Lond., F.R.C.S. Eng.,
Assistant Surgeon to the Cancer Hospital, &c.
Pp. 245. 132 Illustrations. 2 Col. Plates. 30s. net.
"Masterful and complete. . . . Cannot be too highly praised."
—SURG. GYN. AND OBSTET. JOUR.
Oxford University Press, Amen House, London, E.C.4.

THE HUMAN BODY
By LOGAN CLENDENING, M.D.
A very readable but accurate account of the human body, its anatomy, physiology and diseases. With 102 illustrations from photographs, old prints, diagrams and drawings. 10s. 6d. net.
Lancet:—"*He has, we think, succeeded extraordinarily well in a very difficult task . . . The good common sense and absence of faddism are particularly notable.*"
Wm. Heinemann (Medical Books), Ltd.
99, Great Russell-street, London, W.C.1.

With 25 Illustrations. Demy 8vo. 9s. net; postage 5d.
STERILITY IN WOMEN:
DIAGNOSIS AND TREATMENT.
By SIDNEY FORSDIKE, M.D., B.S. (Lond.), F.R.C.S., Surgeon to the Hospital for Women, Soho Square, London, &c.
"Shows . . . evidence of rich personal experience; will well repay the most careful study."—THE LANCET.
London: H. K. Lewis & Co. Ltd., 136 Gower-street, W.C.1.

CANCER OF THE BREAST,
AND ITS TREATMENT.
By W. SAMPSON HANDLEY, M.S., M.D.Lond., F.R.C.S. Eng.
Second Revised Edition. With 82 Illustrations. 30s. net.
Published for the Middlesex Hosp. Press by John Murray, London.

BY J. F. HALLS DALLY, M.A., M.D. CANTAB.,
M.R.C.P., Senior Physician to Mount Vernon Hospital.
HIGH BLOOD PRESSURE
Second Edition, Revised and Enlarged. Illustrated. 12s. 6d. net.
LOW BLOOD PRESSURE
Its Causes and Significance. Illustrated. 15s. net.
Wm. Heinemann (Medical Books), Ltd., 99, Great Russell St., W.C.1.
"Should be in the possession of every medical man."
—GLASGOW MEDICAL JOURNAL.

URINARY SURGERY
A Handbook for the General Practitioner.
By W. K. IRWIN, M.D., F.R.C.S.,
Assistant Surgeon, St. Paul's Hospital for Genito-Urinary Diseases.
"Clearly written . . . furnishes the practitioner with information of great practical value in his everyday work."—BRIT. MED. JOUR.
SECOND EDITION. REVISED AND ENLARGED.
Price 10s. 6d. (postage 6d.).
Baillière, Tindall & Cox, 7 & 8, Henrietta-street, London, W.C.2.

NOW READY.
TWENTIETH EDITION.
HALE-WHITE'S MATERIA MEDICA
Revised by
A. H. DOUTHWAITE, M.D., F.R.C.P.,
Assistant Physician, Guy's Hospital.
10s. 6d.; postage 5d.
London: J. & A. Churchill, 40, Gloucester-pl., Portman-sq., W.1.

NOW READY.
TWENTIETH EDITION.
WILLIAMS' MINOR SURGERY AND BANDAGING
By GWYNNE WILLIAMS, F.R.C.S.,
Surgeon, Univ. Coll. Hosp.
262 Illustrations. 10s. 6d.; postage 5d.
London: J. & A. Churchill, 40, Gloucester-pl., Portman-sq., W.1.

SHORT ESSAYS ON MEDICAL TOPICS.
By C. O. HAWTHORNE, M.D. 4s. 6d. net, post free 5s.
"This is, in brief, a collection of well-written and thoughtful papers on medical matters and the medical life—not to be looked through once and put aside, but kept in a handy place for occasional reading, with other books which are opened with expectation and studied with profit."—BRITISH MED. JOUR.
London: John Bale, Sons & Danielsson, Ltd.,
83-91 Great Titchfield-street, Oxford-street, W.1.

DISEASES OF THE RECTUM AND COLON
AND THEIR SURGICAL TREATMENT.
BY
J. P. LOCKHART-MUMMERY,
F.R.C.S.ENG., M.A., M.B., B.C.CANTAB.,
Senior Surgeon to St. Mark's Hospital.
Over Two Hundred Plates and Illustrations. Price 25s.
Baillière, Tindall & Cox, 8, Henrietta-street, Covent Garden.

THE THOMAS SPLINT AND ITS MODIFICATIONS IN THE TREATMENT OF FRACTURES.
By MEURICE SINCLAIR, C.M.G., M.B., CH.B. (EDIN.).
Pp. 152. 85 Illus., with X-Ray Photographs, 3 Charts. 15s. net.
Oxford University Press, Amen House, London, E.C.4.

BY LIEUT.-COL. ROBERT HENRY ELLIOT,
M.D., B.S. Lond., F.R.C.S. Eng., I.M.S., retd.
A TREATISE ON GLAUCOMA.
2nd Edition, Revised and Enlarged. 30s. net.

TROPICAL OPHTHALMOLOGY.
With 7 Plates and 117 Illustrations. 31s. 6d. net.
Spanish and French Editions, 1922. Full German Abstract.

THE CARE OF EYE CASES: 12s. 6d. net.
A MANUAL FOR NURSES, PRACTITIONERS, AND STUDENTS.
Chinese Edition. Oxford University Press.

GLAUCOMA 4s. net.
A HANDBOOK FOR THE GENERAL PRACTITIONER.

THE INDIAN OPERATION OF COUCHING FOR CATARACT.
7s. 6d. net. H. K. Lewis and Co. Ltd.

J. & A. CHURCHILL

NEW EDITION Next Week

EDEN & HOLLAND'S MANUAL OF MIDWIFERY
By T. W. EDEN, M.D., Cons. Obstet. Physician, Charing Cross Hospital; and EARDLEY HOLLAND, M.D., Obstet. and Gyn. Surgeon, London Hospital.
7TH EDITION. 21s. Postage 9d

TWO NEW RECENT ADVANCES

4 Illustrations. 12s. 6d. Post. 6d.
PSYCHONEUROSES
By MILLAIS CULPIN, M.D. Contributions by JAMES YOUNG, M.D., A. R. REDFERN, M.B., E. MILLER, D.P.M., and J. R. REES, M.D.

120 Illustrations. 12s. 6d. Post. 9d.
RADIOLOGY
By PETER KERLEY, M.B., B.Ch., D.M.R.E.

By JAMES MENNELL, M.D. B.C. (Cantab.),
Medical Officer, Physico-Therapeutic Department, St. Thomas's Hospital.
48 Illustrations. 10s. 6d. Post. 6d.
BACKACHE

2nd Ed. 167 Illustrations. 21s. Post. 9d.
MASSAGE: ITS PRINCIPLES AND PRACTICE

London: J. & A. Churchill, 40, Gloucester Place, Portman Square, W.1.

"The Standard."

For a really reliable strapping see that you get ZŌPLA

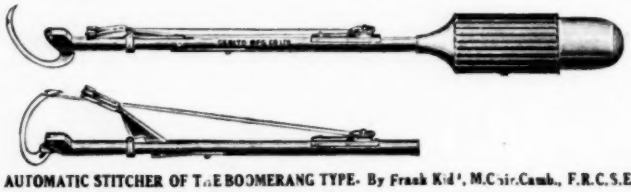
It is British. It is always of the same high quality.
It has a powerful grip. It does not irritate.
It keeps well. It is supplied on various cloths and felts.

Each spool packed in a tin which keeps plaster in perfect condition. Sample on request.

LESLIES LTD., Medical Plaster Manufacturers,
High Street, Walthamstow, LONDON, E.17

THE GENITO-URINARY MFG. CO., LTD.

By Appointment to St. Peter's Hospital for Stone, India Office, War Office, Admiralty, Crown Agents for the Colonies.



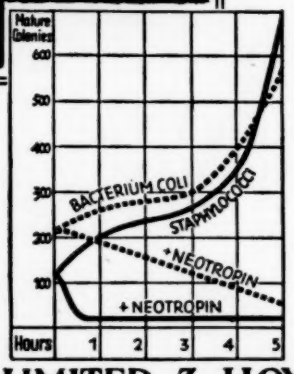
CYSTOSCOPES
URETHROSCOPES
DIATHERMY

AUTOMATIC STITCHER OF THE BOOMERANG TYPE. By Frank Kidd, M.Chir.Camb., F.R.C.S.Eng.

28a, DEVONSHIRE STREET, LONDON, W.1.
Telephone: WELBECK 3529. Telegraphic Address: "CYSTOSCOPE, WESDO, LONDON."
Sole Agents for Great Britain for J. EYNARD CATHETERS, etc., PARIS.

TRADE MARK **NEOTROPIN** BRAND
BUTYLOXY-DIAMINO-AZO-PYRIDIN.

A urinary antiseptic of remarkable powers of penetration and tissue affinity; highly bactericidal



Original Packing:
Bottles of 30 dragées of 1.5 grains.

The curves show the increase in growth of bacteria in ordinary urine compared with the decrease in growth produced by Neotropin

NEOTROPIN is a dye-stuff of the azo-pyridine series and possesses the marked powers of penetration and tissue affinity inherent to dyes. Shortly after its administration it imparts a yellowish red colour to the urine and later the prostatic, testicular and cervical secretions.

The bactericidal effects of Neotropin have been confirmed by a long series of experiments both in vitro and in vivo. Even in a dilution of 1/512,000 it still inhibits bacterial growth.

Its combined penetrative and antiseptic properties render it invaluable in the treatment of Bacteriuria, Cystitis, Pyelitis and Pyelonephritis.

Its freedom from any irritant effect explains its remarkable efficacy in acute gonorrhoea and cystitis.

SCHERING LIMITED, 3, LLOYD'S AVENUE LONDON, EC.3

From whom samples and literature will be sent on request.

THE LANCET

A JOURNAL OF BRITISH AND FOREIGN MEDICINE, SURGERY, OBSTETRICS, PHYSIOLOGY, CHEMISTRY, PHARMACOLOGY, PUBLIC HEALTH, AND NEWS.

No. 5618. LONDON, SATURDAY, MAY 2, 1931. CCXX.

CONTENTS

THE WHOLE OF THE LITERARY MATTER IN THE LANCET IS COPYRIGHT.

ADDRESSES AND ORIGINAL ARTICLES

The Spleen: Its Structure, Functions, and Diseases. By J. W. McNEE, F.R.C.P.—Lect. I. (*Illustrated*).. 951

Non-Operative Treatment of the Senile Prostate. By J. CURTIS WEBB, M.B., and S. L. MUCKLOW, M.B., D.M.R.E. 957

Cavernous Sinus Thrombosis: A Fatal Complication of Minor Facial Sepsis. By W. G. SCOTT BROWN, M.B., F.R.C.S.—(*Illustrated*) 960

Spontaneous Tumours in Mice. Influence of Diet and Age. By Sir LEONARD HILL, M.B., F.R.S. 966

Unusual Complications of Diphtheria. By E. NOBLE CHAMBERLAIN, M.R.C.P. and S. ALSTEAD, M.B.—(*Illustrated.*)..... 970

Thoracoscopic Technique Influenced by Type and Position of Adhesions. By F. G. CHANDLER, F.R.C.P... 971

CLINICAL AND LABORATORY NOTES.

Thirty-eight years with a Fractured Spine. By DOUGLAS GREEN, F.R.C.S. 972

Recurring Herpes Genitalis in the Male. By J. AVIT-SCOTT, M.D. 972

MEDICAL SOCIETIES.

Ophthalmological Society. (Annual Congress) 973

London Jewish Hospital Medical Society 976

North of England Obstetrical and Gynæcological Society 977

Liverpool Medical Institution 978

REVIEWS AND NOTICES OF BOOKS.

Fractures and their Complications. By G. E. Wilson, F.R.C.S..... 979

Pye's Surgical Handicraft. By H. W. Carson, F.R.C.S. 979

Ultra-violet Radiotherapy. By W. Kerr Russell, M.D. 979

Lectures on Diseases of Children. By Robert Hutchison, F.R.C.P. .. 980

Clinical Nutrition and Feeding in Infancy and Childhood. By I. Newton Kugelmass, M.D. 980

How You Work: An Introduction to the Human Body. By Isabel Wilson, M.D... 980

Clio Medica: Physiology. By John F. Fulton, M.D. 980

LEADING ARTICLES.

HOSPITALS AND PAY-BEDS 981

MEDICAL PATENTS..... 981

MOTTLED TEETH..... 982

ANNOTATIONS.

Irrigation New and Old 983

Occupational Nystagmus 984

Hæmosiderinuria..... 984

Factors in Sexual Impotence 985

Negative Phase in Antidiphtherial Immunisation 985

Testicular Grafts on Rams 985

Trachoma in Poland.... 986

Plankton and Bacteria in Sewage 986

Growth of Visual Perception in Children 986

The Pathogenesis of Pink Disease 987

Streptococcal Variation.. 987

Radiography of Abdominal Arteries..... 988

THE SERVICES.

Royal Naval Medical Service.—Royal Army Medical Corps.—Royal Air Force 988

PUBLIC HEALTH SERVICES.

Payment for Accident Cases at Hospitals.... 993

Unsound Food Given away as Prizes..... 993

Infectious Disease in England and Wales.... 993

SPECIAL ARTICLES.

Immunity in Virus Diseases. By C. H. ANDREWES, M.R.C.P.—I. 989

Ireland.—A Midwives Bill 992

Medicine and the Law .. 992

Hospital Out-Patients .. 1001

Cancer of the Lip, Tongue, and Skin 1002

CORRESPONDENCE.

The Post-Graduate Hospital and School (Sir Henry Simson, Sir W. Hale-White, and Dr. C. L. Batteson) ... 994

Incubation Period in Epidemic Catarrhal Jaundice (Dr. W. N. Pickles)..... 994

Treatment of Functional Anorexia (Dr. R. D. Gillespie) 995

Syphilis and Yaws (Dr. H. S. Stannus)..... 995

Durocaine in Spinal Anæsthesia (Dr. W. Howard Jones)..... 996

Insulin and Preservative (Drs. O. Leyton and E. P. Poulton) 996

Undulant Fever in Ships (Fleet-Surg. Home) .. 997

The Late Margaret McMillan (Mr. Albert Mansbridge) 997

A Simple Method for Blood Culture (Dr. J. E. McCartney) 997

Tuberculin-Testing of Milch Cows (Mrs. R. M. Foot)..... 997

Homer's Surgeons (Dr. E. Fuld)..... 1007

PARLIAMENTARY INTELLIGENCE.

Notes on Current Topics: Housing (Rural Workers) Amendment Bill.—Sick and Infirm Voters at Elections.—Workmen's Compensation Bill.—The Budget.—Pharmacy and Poisons Bill.—Yarmouth Naval Hospital Bill 998

House of Commons: Pensions for Neurasthenia and Shell Shock.—Imported Milk.—Rejection of Army Recruits.—Approved Societies and Voluntary Hospitals.—Medical and Dental Scholarships.—National Health Insurance Funds.—Public Vaccinations .. 999

OBITUARY.

Henry Percy Dean, F.R.C.S. 1003

The Late Maj.-Gen. G. F. A. Harris, I.M.S. 1003

MEDICAL NEWS.

University of Cambridge. 1003

Royal College of Surgeons of England 1003

Royal Medical Benevolent Fund 988

Hospital Almoners..... 991

Lancashire Joint Hospital District 993

Middlesex Hospital..... 993

Royal Victoria Hospital, Belfast 997

Glasgow Ear, Nose and Throat Hospital..... 1000

British Orthopædic Association..... 1002

West-End Hospital for Nervous Diseases..... 1003

Bayliss-Starling Memorial Scholarship 1003

Society of Apothecaries.. 1003

Perth Mental Hospital... 1004

Memorial to William Smellie 1004

Rockefeller Medical Fellowships 1004

NOTES, COMMENTS, AND ABSTRACTS.

Maintenance of Tubercle-Free Herds of Milch Cows 1006

Education and Entertainment for the Blind.... 1006

Materials of Bread-making 1007

Salubridad 1007

New Preparations: "Wellcome" Brand Diphtheria Prophylactic.—T.A.F.—Dispert Products.—Idozan.—Byno-Eugastrol.—Lactogen.—Neotropin.—Botol..... 1008

Medical Diary 1004

Appointments 1005

Vacancies 1005

Births, Marriages, Deaths 1008

H. K. LEWIS & CO. LTD., MEDICAL PUBLISHERS AND BOOKSELLERS

Text-Books and Works in Medical, Surgical, and General Science of all Publishers.

Orders by Post or Telephone promptly attended to. **Catalogues post free on Application.**

Estimates given for binding. **Sets of Periodicals bound to order.**

Special Stock of Medical Stationery, Loose Leaf Case Books, Card Index Systems, Case Sheets, Filing Cabinets, Name Plates in Bronze or Brass, etc.

Prompt attention to orders and enquiries for Foreign Medical and Scientific Books. Department for SECOND-HAND BOOKS, 140, Gower Street.

MEDICAL AND SCIENTIFIC CIRCULATING LIBRARY

Annual Subscription, Town or Country, from One Guinea. *Prospectus on application.*

LIBRARY READING ROOM (first floor) OPEN DAILY TO SUBSCRIBERS. Hours 9 a.m. to 6 p.m. Saturdays to 1 p.m.

136, GOWER STREET, and 24, GOWER PLACE, LONDON, W.C. 1.

Telegrams: "PUBLICAVIT, EUSROAD, LONDON." Telephone: MUSEUM 7756 (3 lines).

OXFORD MEDICAL PUBLICATIONS

A New (Eighth) Edition of THOMSON and MILES' MANUAL of SURGERY

(Volume One—GENERAL SURGERY)

By **ALEXANDER MILES**, M.D., LL.D., F.R.C.S.(Ed.),
Consulting Surgeon, Royal Infirmary, Edinburgh,
and **D. P. D. WILKIE**, M.D., F.R.C.S.(Ed. and Eng.),
Professor of Surgery, University of Edinburgh.

Contents include:—Repair—Conditions which Interfere with Repair—Inflammation—Suppuration—Ulceration and Ulcers—Gangrene—Bacteria and other Wound Infections—Surgical Manifestations of Tuberculosis—Syphilis—Tumours—Injuries—Methods of Wound Treatment—Constitutional Effects of Injuries—The Blood Vessels—The Lymph Vessels and Glands—The Nerves—Skin and Subcutaneous Tissue—The Muscles, Tendons, and Tendon Sheaths—The Bursæ—Diseases of Bone—Diseases of Joints.

Pp. 590. 176 Illustrations. **12s. 6d.** net.

BREAST-FEEDING

By **MARGARET EMSLIE**, M.B., Ch.B.,
Late Senior Assistant Medical Officer for Maternity and Child Welfare, County Borough of Croydon; Formerly Senior Clinical Assistant, Hospital for Sick Children, Great Ormond Street, London; Medical Officer, Southfields Centre.

Contents include:—The Preparation for Breast-feeding—Anatomy and Physiology of the Breast—The Establishment of Breast-feeding—The Management of Breast-feeding—The Child on the Breast—Difficulties in Breast-feeding—Weaning.—Sore Nipples, Breast Abscess.—An Experiment in breast-feeding.—Working-class Mothers' time-table.

Pp. 154. 22 Illustrations. **5s.** net.

PRIMARY SYPHILIS IN THE FEMALE

By **THOMAS ANWYL DAVIES**, M.D.(Lond.),
Director of the Whitechapel (L.C.C.) Clinic, Turner Street, E.1; Late M.O. in Charge, and Late S.M.O. of the Venereal Department at St. Thomas's Hospital, S.E.1.

Contents include:—The Incidence of Primary Syphilis—The Symptoms of Primary Syphilis in the Female—The Sex Differences of the Primary Lesion—Sites of the Primary Lesion—Examination of the Patient—The Abnormal Appearances and Lesions of the Vulva—Chancres of the Labia Majora—Chancres of the Labia Minora—Chancres on the Fourchette—Chancres of the Urethra—Chancres of the Clitoris—Chancres of the Vagina—Chancres of the Cervix—The Differential Diagnosis of Cervical Lesions—The Abnormal Appearances and Lesions of the Cervix—Extragenital Chancres—Chancroid—Vulval "Condylomata"—Trichomonas Vaginitis—The Abnormal Appearances and Lesions of the Vagina.

Pp. 120. 25 Plates (17 Natural-colour Photographs). **12s. 6d.** net.

THE DIET BOOK

FOR DOCTOR, PATIENT, AND HOUSEWIFE
With Specimen Menus for One Week and Recipes.

By **MARGUERITE REQUA REA** (Mrs. Alec. L. Rea).
With a Foreword by Sir JAMES PURVES-STEWART, K.C.M.G., C.B., M.D.(Ed.), F.R.C.P.(Lond.),
Physician to Westminster Hospital.

Contents include:—Acute Colitis Dietary—Constipation Dietary—Convalescent Dietary—Diabetic Dietary—Dysentery Dietary—Gastric Ulcer Dietary—Gastritis Dietary—Gout Dietary—Hypertension Dietary—Obesity Dietary—Rheumatism Dietary—Semi-solid Bland Diet—Notes on Equipment and Cooking—Tables—Recipes.

Pp. 120. **7s. 6d.** net.

COMPLETE CATALOGUE SENT ON REQUEST.

Oxford University Press

HUMPHREY MILFORD. **Amen House, Warwick Square, London, E.C.4.**
Telephone: CITY 2604. *Telegrams:* FROWDE, CENT., LONDON.

ADDRESSES AND ORIGINAL ARTICLES

THE SPLEEN: ITS STRUCTURE, FUNCTIONS, AND DISEASES.

By J. W. McNee, D.S.O., M.D., D.Sc. Glasg., F.R.C.P. Lond.,

ASSOCIATE PHYSICIAN TO UNIVERSITY COLLEGE HOSPITAL, LONDON.

LECTURE I.

THE human spleen is of considerable size, easily accessible, and, when enlarged, easily palpable through the abdominal wall. Thus it is not surprising to find far back in the history of medicine numerous records of curious beliefs and speculations about splenic function which were the outcome of the attention paid to this organ by early writers. Yet real knowledge of its intimate structure has accumulated amazingly slowly in comparison with that of other organs of the body. One good reason for this is no doubt the fact, established from the earliest times, that the spleen has not any function absolutely essential for life, and so some less fundamental reasons for its presence in the body had to be discovered.

Early Physiology.

The very earliest views concerning splenic function are not easy to trace, and I am greatly indebted to various friends interested in the history of medicine, and particularly to Dr. Charles Singer, for help in this connexion. Interesting accounts are also contained in the book of Charles Gray (1854), and in the recent review by Krumbhaar (1926).

The spleen was described by Hippocrates in his treatise "De Carnibus," and he states that its function is to draw the watery part of the food from the stomach. Aristotle also described the organ and suggested a somewhat similar function. Nothing further of note emerges until we come to Galen (A.D. 130–200), who rightly termed the spleen an organ "full of mystery." Galen's physiology was built around the hypothesis of the four humours—blood, phlegm, choler, and melancholy. Gradually each humour became associated with a corresponding organ of the body, generally the brain with phlegm, the heart with blood, the liver with choler, and the spleen with "black bile" or melancholy. To fit in with this old physiology a spurious anatomy was invented, and an imaginary duct was traced from spleen to stomach, for the excretion of "black bile." Excess of one or other of the four humours was supposed to produce a phlegmatic, sanguine, choleric, or melancholic temperament, and deficiency the reverse. These ancient views of Galen persisted, and were believed almost universally for more than a thousand years, and Robin in his interesting book, "The Old Physiology in English Literature," states that at the University of Cambridge, in the fourteenth century, medical students were still compelled to attend two full courses of lectures on "Galen's Commentaries upon Hippocrates." The ideas expressed in the Galenic physiology have provided many striking passages for the classical writers of English poetry and prose (see Robin), and even now we may speak of "venting our spleen." Some of the hypotheses known to Galen were also described, but in far less accurate form (as Dr. Singer has assured me) by Pliny (A.D. 23–79). The first translation of Pliny into English is a remarkable volume, published by Philemon Holland in 1601. It is a rare book, but I have seen Dr. Singer's copy, and it is both interesting and amusing. Pliny's writings are of particular interest to us, in that he makes the first definite reference that I have been able to trace, to extirpation of the spleen in runners.

Here is the passage, copied from Philemon Holland's book:—

> "This member hath a proprietie by itselfe sometimes, To hinder a mans running: whereupon professed runners in the race that bee troubled with the splene, have a devise to burne and wast it with an hot yron. And no marveile: for why? they say that the splene may be taken out of the bodie by way of incision, and yet the creature live nevertheless: but if it be man or woman that is thus cut for the Splene, hee or shee looseth their laughing by the meanes. For sure it is, that untemperate laughers have alwaies great splenes."

As regards the last part of the quotation it will be noticed that Pliny is a little muddled, as is indeed often the case, for on the hypothesis of the four humours it is the melancholics who should have great spleens, and not the laughers. There is a well-known tradition, and perhaps even written evidence, although I have been unable to discover it even after much search, that the spleens of Greek runners even in the earliest times were removed to increase their speed and endurance. Gurlt, in his monumental "History of Surgery," gives no clue to the origin of this tradition, and apart from giving the reference to Pliny, just described, he merely mentions that the subject is referred to in the ancient Hebrew Talmud.

So much for the earliest views concerning splenic function—an interesting story on which a whole series of lectures could be based. After Galen there is little speculative writing to detain us until the seventeenth century, after Francis Bacon had laid the foundations of the renaissance of science.

SUCCESSFUL SPLENECTOMY.

Experiments began, and the first recorded splenectomies were carried out in dogs by Zambeccari in 1680. Malpighi, the discoverer of the lymph follicles in the spleen, had earlier (1665) ligated the splenic vessels in dogs without apparently injuring their health, and later he also performed splenectomy successfully in the same animals. Similar experiments were done by many others, especially in England, and the facts were well known to Stukeley in 1722. Various symptoms, not harmful to health, such as increased frequency of micturition and voracious appetite, were described as sequels to the operation.

The first operation for removal of the human spleen is said to have been performed by Zaccarelli in 1549. Pernet, Moynihan, and Krumbhaar all refer to this case in their accounts of the history of splenectomy. The case is recorded with great circumstantial detail by Fiorovanti (1518–88), who, however, is described by Stukeley as "a famous empiric, and the first mountebank in Europe." The patient was a young woman of 24, named Marulla, wife of a captain, and her spleen was so large as practically to fill the abdomen. The services of Zaccarelli, of Naples, were enlisted, and he successfully removed the spleen, recovery being complete in 24 days. The organ is said to have weighed 32 oz. after removal from the body, which tallies ill with the previous clinical description of its size.

* The Lettsomian lectures delivered before the Medical Society of London on Feb. 16th and 25th, and March 4th 1931.

Another early case (1676) is of especial interest, if authentic, since it may have been the first human splenectomy performed in this country. It is recorded by Dr. Timothy Clarke (physician to Charles II., and a friend of Pepys) as related to him by a Dr. Turbervile. Here again the reputed facts of the case are given in considerable detail. The patient was a Somerset man, William Panier, who attempted suicide by stabbing himself in the left side with a butcher's knife, so that spleen, omentum, and intestines projected. Three days later a surgeon replaced the intestines, and cut away the spleen and omentum. Recovery to perfect health ensued, and the man was known to be alive years afterwards. Various other curious cases of removal of the spleen after knife wounds are referred to in the literature (Spencer, 1920), and it seems probable that in times of war opportunities for the operation would be offered from time to time. It must be remembered, however, that facilities for publishing such cases in print were extremely limited until 100 years ago.

In more recent times there is the well-known case of Spencer Wells (1866), which is probably one of the first English cases in which the abdomen was deliberately opened and the spleen at once removed, but the patient died one week later. With the advent of Listerian principles of surgery splenectomy was soon frequently performed, but at first the death-rate from the operation was high.

STUDIES OF FUNCTION.

We may return now to a consideration of how real knowledge of the structure and functions of the spleen was acquired, after the influence of Galen and his teaching had waned. We may fittingly commence with the observations of the famous Italian anatomist Malpighi (1665), who not only described the lymph follicles but also noted in dogs that the trabeculæ were muscular and capable of contraction. As to function he considered that the organ was essentially a gland, and although it had no ducts he suggested that the large veins and spongy structure of the organ would adequately suffice for glandular excretion. His final conclusions, however, were quite definite: "What therefore is to be thought of this artificial bowel, I am perfectly ignorant." In 1722, William Stukeley gave his Goulstonian lecture to the Royal College of Physicians of London, On the Spleen: Its Description and History, Use and Diseases. The lecture was published for the author in 1723, and is a most beautiful book, illustrated by his own fine drawings. Stukeley's work is remarkable both for its style and for the ideas expressed, some of which, as shall be seen, were far in advance of his own times. Some of his introductory remarks (page 2) are delightful.

> "The uses of the apparatus [i.e., the contents of the abdominal cavity] are by the industry of the Curious pretty manifest, except that of the Spleen; which yet has not fail'd to be a subject of enquiry in all ages, and has rack'd the brains of physicians, as well as the bowels of their patients. . . . But still, what formerly was the seat of joy [here Stukeley follows Pliny] is become a topic of grief to the moderns, since our improvements have presented us with no other than a negative knowledge therein; and in the main we are forc'd to own our ignorance of nature's intention in forming the curious organ of the spleen."

Stukeley's own views of splenic function are, however, set forth with the utmost clearness, and are of great historic interest in view of recent developments in splenic physiology (Barcroft, Binet, and others). He recognised that this spongy organ could, when filled with arterial blood, "at pleasure upon its contraction" empty itself again. He asserted that the organ served to maintain the balance of the circulation, acting as a sort of diverticulum or safety valve to the general systemic circulation. Some of his remarks are for us even nowadays so apt, that he may be allowed briefly to speak for himself in some sentences from page 50 of his book.

> "I take it for granted that in common way of living we make more blood than is just necessary for the occasions of life; and without this provision, we should be subject to a thousand inconveniences."
>
> "She would be a very imprudent and improvident mother, or rather stepmother, that was so niggardly as only to take care of supplies the moment we want it. So complicated a machine, liable to external injuries and internal disorders, must have a reasonable *overplus*, a stock in hand to be employed whenever there is occasion, and for fear a regular supply should be procrastinated."
>
> "Even regular exercise and muscular motion . . . demand a considerable plenitude of juices; and if there was not more than enough, we should be continually fainting."
>
> "Therefore this so necessary a surcharge of blood, I suppose so regulated by the spleen, as that no inconveniences arise from it." . . .

Stukeley's views were supported in the main by Lieutaud (1738, 1742) and Hodgkin (1832).

If Stukeley's book may be regarded as the "classic" on the spleen in the eighteenth century, then the book of Henry Gray, "On the Structure and Use of the Spleen," published in 1854, holds the same position in the next century. He gives a remarkably full historical account, on which I have freely drawn for these lectures, and also a whole series of interesting observations made by himself. He unfortunately failed, in his experiments, to prove the contractile power of the spleen, and so he gives the organ a much more passive rôle as a regulator of blood-supply than did his predecessor Stukeley.

A contemporary of Henry Gray, the comparative anatomist Kölliker (1849), first noticed the disintegration of red blood corpuscles within the cells of the spleen. This fact was soon amply confirmed by other observers and formed, until very recent years, the basis of the sole function attributed to the spleen in subsequent text-books.

Structure of the Spleen.

It has been convenient to describe the early history of our knowledge of splenic function without much reference to structure, since, if we except Malpighi's discovery of the lymph follicles, little was known except the gross anatomy of the spleen, until the rapid development of microscopic and histological technique in the middle of last century.

We may now, however, turn definitely to the problems of splenic structure, and since my object is to lead up to a consideration of the various forms of splenic disease met with in human beings, I shall confine myself to points in structure which may be important in that connexion. Full reviews of the modern development of our knowledge have been given by Tait and Cashin (1925), and by Hueck (1928). It is seen that most of the important papers date from the middle of last century, and that there is scarcely any agreement among them on fundamental points. It is also obvious that in recent times much of the older work, and its possible significance, has been completely forgotten. It has disappeared, at any rate, from all except some of the largest text-books of histology, and generally the descriptions given of the finer histology of the spleen in student's text-books are very poor and meagre. As soon as I began to be interested in diseases of the spleen, I naturally read the best available accounts of splenic histology, but the extreme divergences of opinion was an unexpected obstacle. Since, however, comparative studies of the structure of the liver lobule in different animals had greatly helped me in

the understanding of hepatic disease, I determined to apply the same method to the spleen. In this work I was fortunate in having the coöperation of M. F. Cashin, who had already published work with Tait on the structure of the spleen. I may say at once that this comparative study of the spleens of animals has been of the greatest help in elucidating some of the problems of the complex human spleen. Our observations are given in detail elsewhere, and it should be stated that Gray, Whiting, Magnam, and others have made similar observations in the past, but not since improvements in histological technique, and especially not since recent developments in splenic physiology have been known to us. Reference should also be made here to the careful work of Mills (1927) on the spleen of the skate, and to the recent (unpublished) work of Basin, in Prof. J. P. Hill's laboratory at University College, on the spleen of echidna.

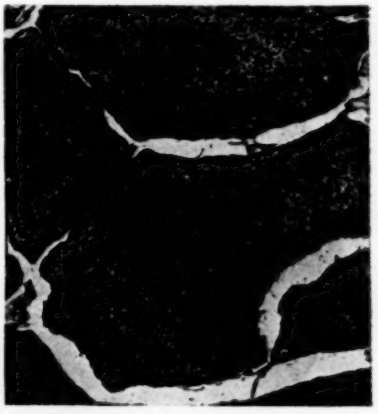
IMPORTANT ANATOMICAL FEATURES.

The following points concerning the structure of the spleen are important for the interpretation of the pathology of human splenic disease. Some of them have been known for many years; others were known but forgotten, and have been rediscovered anew; a few have only been lately recognised.

The spleen of all vertebrates is covered, below the peritoneal coat, by a fibro-elastic *tunica propria* which contains abundant muscle-fibres in some animals, such as the cat and the dog, which have been the subjects of many experiments concerning splenic contraction. In man, however, the muscle tissue of the spleen is chiefly confined to the splenic *trabeculæ*, structures which are not found in all vertebrates, being entirely absent from the fishes. These trabeculæ are definitely muscular, and arise both from the covering tunica propria and from the sheaths of the main blood-vessels. They are obviously of critical importance in relation to the contractility of the organ. The *reticulum* or *reticular network* is a structure often misunderstood, as Tait has pointed out, but it is a most important element in the structure of the spleen. It was first described by Tigri (1847) and again by Billroth (1857), but the name reticulum was first applied by Mall in 1890 to describe the peculiar meshwork in the spleen which, by special microchemical methods, he showed was different from the fibres both of white-fibrous and of yellow-elastic tissue. It has been held by others, however, that such a sharp distinction is not justifiable (R. A. Young, 1892). Ranvier (1891) first described the large multipolar cells lying on the reticular network of the spleen, and these cells, together with large amœbic phagocytic cells first observed by Ponfick (1869), constitute along with the reticulum the essential structures of the spleen-pulp. These cells are now included as an important part of the reticulo-endothelial system (Aschoff). The *Malpighian corpuscles* (Malpighi, 1669) are simply aggregations of lymphocytes, surrounded by a rather denser zone of reticulum than elsewhere. They are to be regarded simply as tiny lymph glands within the spleen, and they behave quite independently of the remainder of the splenic tissue in most human diseases. In our comparative study of the spleens of animals they were found to be inconstant. Fishes have none at all, but they occur in reptilia and all other animals higher in the scale. Some birds' spleens show them to be present, but in others they are absent. In mammals they are always more prominent in the young than in the old, and this is explained by the work of Gross, referred to later on.

The *lobularity of the spleen* is, I believe, a most important fact to take note of, and one which affects many pathological processes. All spleens are essentially lobular in structure, but this has often been forgotten in studies confined to the complex spleens of man and the higher animals. Yet a tendency to lobularity can still be made out by special methods of staining even in the adult human spleen, and, as is noted later, definitely lobulated human spleens are not altogether rare. In fishes, and even more remarkably in reptilia, lobulation is distinct. In one lizard examined (*Veranus niloticus*) the subdivision into lobules is complete, each separate lobule being supplied by its own end-artery. In the spleen of a crocodile Cashin and I calculated that there were probably about three hundred separate lobules.

FIG. 1.



Lacertilia. *Veranus niloticus* (monitor). The lobular structure of the spleen is shown; each lobule has a central artery, and the blood is confined in venous sinuses (low power).

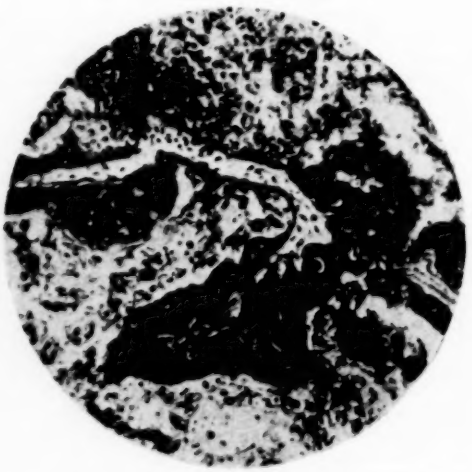
The *vascular system of the spleen* is obviously of critical importance for the development of all pathological processes, but the study of this system has always presented great difficulties and has led to much divergence of opinion which is not yet reconciled. The main blood-supply to the spleen, and the collateral circulation, has an importance both for the surgeon and the pathologist. It has been well studied by Valdoni (1929), an Italian surgeon, with the help of opaque vascular injections and X rays. The splenic artery in man is remarkable for its large size in proportion to the bulk of the organ. As a rule it is a single vessel, breaking up close to the hilum into a number of branches, but occasionally the branching takes place at some distance before reaching the hilum, causing surgical difficulties in an operation for splenectomy. This latter distribution of the branches of the splenic artery is the normal state in many animals. The main branches of the splenic artery within the spleen are tortuous and spring-like; they divide abundantly until, finally, each branch bifurcates to form two slender arterioles named *penicilli* by Ruysch (1696). These penicilli, as was first strongly emphasised by Cohnheim (1867), are end-arteries, and do not anastomose. An important part of the internal vascular arrangement of the spleen is the so-called *ellipsoid*, a structure formerly well known to histologists, but for a long time almost forgotten. The structure and significance of the ellipsoid has been very fully investigated by Tait and Cashin, and the history of its discovery has already been fully described by myself elsewhere. These peculiar structures were first noted by Billroth (1857), and named "kapillar-hülsen" by Schweigger-Seidel (1863), or "ampullæ" by Thoma (1895). They consist essentially of swellings or condensations

of reticulum (Robinson, 1926) surrounding the penicillar branches of the splenic artery near their terminations. They are present in the spleens of all animals, but vary greatly in their prominence even when demonstrated by special methods of staining. They are seen best of all in fishes, but in the human spleen can only be demonstrated by Indian ink impregnation of the reticulum. An important practical point concerning them is emphasised by Tait and Cashin—namely, that they act as potential valves preventing all flow of blood backwards from the venous to the arterial side of the spleen. More must be said concerning the structure of the ellipsoid, and its probable great importance in the interpretation of important lesions of the human spleen, in another part of these lectures.

FIG. 2.

Elasmobranchii. *Scyllium catulus* (dog-fish). The darkly-staining ellipsoids are well seen. There are neither Malpighian bodies nor trabeculæ (low power).

FIG. 3.



Aves. *Virgo anthropoides* (demoiselle crane). Shows the remarkable development of the ellipsoid, and canaliculi passing through its walls (high power).

The *splenic vein* is even more remarkable for its large calibre, both in proportion to the size of the organ and also in proportion to the calibre of the corresponding artery. Tait and Cashin were much impressed by its enormous contractile power, and by electrical stimulation they produced local contraction sufficient to almost obliterate the lumen. They were so impressed with the great contractility of the vein that they hazarded the opinion that such a contraction in disease might have an important bearing on the development of some human splenomegalies. The walls of the large branches of the splenic vein, within the organ, are riddled with holes, first described by Malpighi, and named by him *stigmata*. These stigmata afford easy communication between the spaces of the spleen-pulp and the vein-lumen. The *venous sinuses* are small open spaces in the pulp, lined by endothelial cells and walled by reticulum. They are present everywhere throughout the spleen, but are most obvious and easily studied in the zone just below the capsule. I am convinced from my own studies that many of the penicillar branches of the splenic artery end, at a short distance beyond the ellipsoid, directly in a venous sinus. I am well aware that Robinson, and some other recent workers, are not in agreement with me on this point, claiming with Mall (1902–03) that the penicilli end freely in pulp spaces and not in blood sinuses lined by endothelial cells. The venous sinuses contain normal blood-cells of every variety, but in many healthy animals, and in various pathological conditions in man, large phagocytic cells containing red corpuscles, or their debris, are also found.

The *spleen-pulp* constitutes the spaces between the reticulum, and for clearness it is best to exclude the venous sinuses. The pulp-spaces are the essential reservoirs of the spleen, and consist of a coarse meshwork of reticulum, on which lie reticulo-endothelial cells, and in the spaces themselves abundant blood-cells of all varieties. They are certainly the largest structural part of the spleen.

Circulation of Blood.

Having described the various vascular structures, let me deal with the thorny problem of the essential mechanism of the circulation through the organ. This has been a subject of acute controversy from the earliest developments of histology, and as yet there is no full agreement on the matter. I believe, however, that the comparative study of the spleen in animals explains some of the difficulties, while others are placed in a new light by recent physiological researches. We now at least have a reasonable working hypothesis of the mechanism of the splenic circulation, and one which fits in with many of the pathological findings in disease. Discussion has always centred round the following hypotheses:—

1. That the circulation is completely closed; that is to say, that the blood in the spleen is never outside of channels lined by endothelium.
2. That the circulation is partly open and partly closed; that is to say, that part of the blood circulates within definite lined channels and part lies in spaces uncovered by endothelium.
3. That the circulation is completely open; that is to say, that the blood from the splenic artery emerges freely into a spongework unlined by endothelium and enters the veins through the holes or stigmata in their walls.

In our comparative study Cashin and I found that the circulation was obviously different in different animals. In fishes a purely open circulation is the rule, whereas in reptiles the circulation is undoubtedly closed. In birds we could arrive at no definite con-

clusions because of technical difficulties with the small fragile vessels. It seems almost impossible to hope to solve the problem by purely histological methods in the complex spleen of man or the higher animals, and there are still supporters of each of the three hypotheses just mentioned. Help has come, however, from the physiological researches of Barcroft and his colleagues on splenic function, and particularly from experiments in which animals were poisoned with carbon monoxide. In these animals it was found that the blood in the spleen pulp remained free from the poison until the spleen contracted after exercise, when the blood in the pulp immediately contained the gas in the same concentration as that in the general circulation. This at once suggested a form of "two-way" or alternative circulation in the mammalian spleen, part of blood passing straight through and part being diverted into the pulp. What is the mechanism in the spleen by means of which such a double circulation is possible? I believe that Barcroft's work, together with the observations and experiments which I shall now describe, suggest strongly the essential structures involved.

EXPERIMENTAL OBSERVATIONS.

Cashin and I, by direct histological examination in several species of animals, were able to verify the earlier opinion of Whiting (1897), that the small splenic arterioles, after passing through the ellipsoids, open directly into blood-sinuses. We also easily confirmed the fact, as some of the microphotographs show, that channels or potential channels, in some animals lined by endothelium, penetrate the walls of the ellipsoids to end in the pulp. A series of experiments was also carried out in cats, in order to obtain support if possible for the above observations. Yeast-cells were grown in culture to approximately the size of the animals' red corpuscles, and injections of these cells were then made into the splenic artery of the living animal under differing conditions. In the first experiments the spleen, before the termination of the injection, was simply clamped off and fixed immediately by multiple subcapsular injections of formalin. In the second experiments the living spleen was kept firmly contracted by electrical stimulation of the nerves during the whole period of injection before it was clamped off and fixed with formalin. In the first experiments the yeast-cells were easily recognisable, by their different staining reaction from blood-cells, both in the blood-vessels and in the pulp. In the second, the yeast-cells were confined to the blood-vessels and blood sinuses, and absent from the pulp.

Further, in direct observations of the thin edge of a mouse's spleen, examined with a dissecting microscope and very powerful light, erythrocytes could be seen lying stationary in the pulp while blood was pumping freely through the adjacent arterioles into sinuses, and then emerging by the veins.

These simple experiments, together with those of Barcroft, undertaken for quite another purpose originally, seem to very strongly support the view that there is a double type of circulation in the spleen of higher animals and in the human spleen.

The solution of the problem of the circulation through the spleen is so necessary for the explanation of important forms of splenic disease that I wish to emphasise again some of the most salient points. It seems unlikely, in the first place, with the histological methods at present available, that we can hope

FIG. 4.

Mammalia (*Felis domestica*). Microphotograph of a cat's spleen washed out with saline solution before fixation. Shows two terminal arterioles (penicilli) with an ellipsoid on the end of each (low power). From a section kindly presented by Prof. J. P. Hill.

FIG. 5.

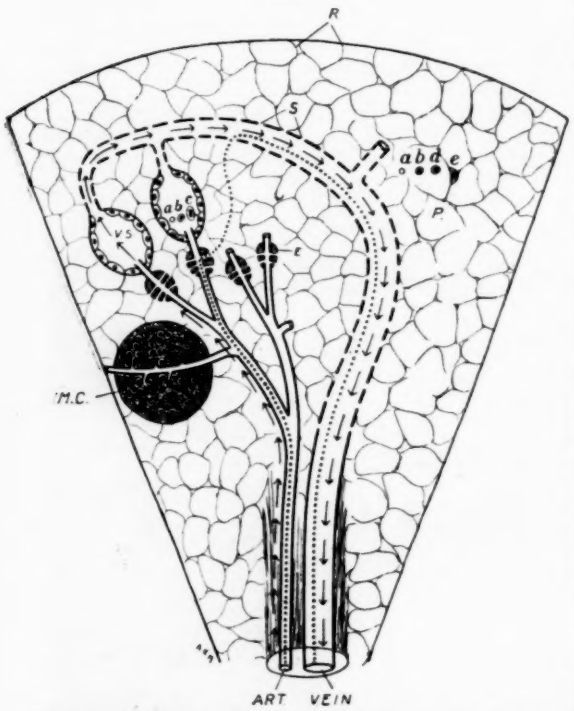
Part of an ellipsoid in a cat's spleen. Shows side channels which in this animal are lined by endothelial cells.

to solve the matter with certainty in the very complex spleens of man and the higher animals. In lower animals, histological methods have been of much service, but chiefly, I believe, because they have shown definite differences in the type of circulation in different animals—open in fishes, and closed in some reptiles. This, as I have stated, may serve to explain the great divergences of opinion regarding the splenic circulation expressed by different histologists during many years. It is only by experiments, and advances on those which have just been described, that a complete answer to our problem may finally be attained.

THE TWOFOLD CIRCULATION.

On the evidence available at present, I submit that our best working hypothesis, agreeing with

FIG. 6.



Diagrammatic representation of a splenic lobule. The succession of arrows indicate closed splenic circulation, while the interrupted line shows open splenic circulation, through the pulp. *M.C.*, Malpighian corpuscle; *E*, ellipsoid; *V.S.*, venous sinus; *P*, splenic pulp; *R*, reticulum; *S*, stigmata in wall of vein. (*a*) Red blood corpuscle; (*b*) leucocyte; (*c*) endothelial cell from wall of blood-sinus; (*d*) lymphocyte; (*e*) multipolar cell of pulp.

many observed facts, is to regard the circulation through the human spleen as twofold. The first, or ordinary circulation going on continually, is a direct one, the blood being pumped through the splenic artery into venous sinuses, and from thence passing directly into the veins. The second circulation is intermittent, brought about by contraction and relaxation of the whole organ, and consists of an emptying of the pulp spaces through the wide stigmata into the veins and a filling again through the lateral channels in the walls of the ellipsoids. It seems probable enough, since minor alterations in the volume of the spleen are constantly taking place, that a small amount of blood is constantly being drawn out from the pulp into the veins to join the direct flow through the spleen; but the admixture of blood from the venous sinuses and from the pulp can, on this view, never be great unless the whole organ has undergone definite contraction.

The ellipsoids are certainly one of the most remarkable structures belonging to the whole vascular system, and there is nothing comparable to them in any other organ. Our knowledge of them has come almost entirely from the spleens of lower animals, since in the highly complex human spleen accurate study by histological methods is practically impossible. Tait and Cashin emphasised the important fact that the ellipsoids can act as potential valves, preventing any reflux of venous blood into the arterial system, and it is easy to realise how important this function may be when the spleen is contracting to empty the pulp. They are, in fact, the only valves or potential valves of the whole splenic vascular system, and it will be remembered that there are no valves in the main splenic vein or even in the portal vein. It is thus easy to see how, in conditions of increased portal venous pressure, the first obstruction, so far as the spleen is concerned, is at the ellipsoids. This is probably the deciding factor in reference to a characteristic lesion, the so-called "siderotic nodule," which is met with in a number of types of splenic disease.

It is well known since the experiments of Warthin, confirmed by Kellaway and myself (unpublished) that ligature of all the splenic veins, even when this is repeated at intervals in the same animal to occlude all newly formed anastomotic channels, does not lead to permanent splenic enlargement, but only to temporary acute swelling, followed ultimately by complete splenic atrophy. It is obvious that such experimental occlusion of the splenic veins is not strictly comparable with that caused by pathological thrombosis. Nevertheless, it is difficult to believe that complete obstruction of the splenic or portal veins, found in some cases of splenomegaly, can be the cause of the enlargement unless accompanied by independent pathological changes within the spleen itself. Experimental thrombosis of the splenic vein in one cat has been produced by a sclerosing solution of quinine and urethane (McMichael, 1931), but without resulting in splenomegaly.

Nerve-supply.

I shall have more to say about the general nervous control of the spleen in my next lecture. Here it is sufficient to state that the synapses of the autonomic nerves appear to be in the cœliac ganglion, and branches accompany the arterial supply to the spleen. Electrical stimulation of a nerve twig accompanying an arterial branch causes a striking segmental contraction, and the segments supplied by different branches do not overlap (Tait and Cashin). For the present the nervous control, except that which may be involved in the mechanism of generalised contraction of the organ, is of no known practical importance in disease.

Weight.

In concluding this lecture, a word or two may be said about the weight of the normal spleen, in animals and in man.

In vertebrates the spleen in comparison with the body-weight varies enormously, its relative weight being greatest in the fishes and least in the birds. In man many observations on the weight of the normal spleen at different ages were made by Henry Gray (1854), and he believed that the organ should be largest when most active in functional activity. In

a series of 160 spleens he noted that the organ is largest during youth and active adult life (average weight 6–7 oz. in the adult), but that in old age the weight, both actual and relative to body-weight, decreases, until in those over 60 years of age the average is only 4½ oz.

The same question has recently been studied by Gross (1918–19), who has added many additional points of interest. He concludes that the spleen is heaviest and has its period of greatest functional activity early in life, and that by the age of 40 the functional activity of the organ has greatly declined. He maintains, moreover, that the histological changes which occur in the spleen with age have a most important bearing on the reactions of the organ to disease, and that middle life is the time when the organ shows its greatest reaction to irritants, using the word in the broadest sense.

BIBLIOGRAPHY.

Aschoff, L.: Ergebn. d. inn. Med. u. Kinderheilk., 1924, xxvi. and Lectures on Pathology, New York, 1924.
Barcroft, J., and others: THE LANCET, 1925, i., 319; 1926, i., 544; Jour. Physiol., 1925, lx., 443; 1927, lxiv., 1; Ergebn. der Physiologie, 1926, xxv., 818.
Billroth, T.: Müller's Archiv, 1857, p. 88, and Virchows Archiv, 1861, xx., 410; 1862, xxiii., 457.
Clarke, Timothy: Ephemerid. Natur. Curios. Ann., iv. and v. (1673 and 1674); Observ., 165, p. 209; De lienis resectione in homine vivo, quoted by Moynihan (1921) and Krumbhaar (1926).
Cohnheim, J.: Virchows Archiv, 1867, xl., 1.
Fiorovanti, L.: Tesoro della vita humana, ii., 8, quoted by Simon, Die Extirpation der Milz, Giessen, 1850; also quoted by Moynihan (1921).
Galen, C.: De Usu Partium, iv.; see also article Medicine in Encyclopædia Britannica.
Gray, Henry: On the Structure and Use of the Spleen, London, 1854.
Gross, L.: Jour. Med. Res., 1918, xxxix., 311.
Gurlt, E.: Geschichte der Chirurgie, 3 volumes, Berlin, 1898.
Hodgkin, T.: Quoted by Gray.
Hueck, W.: Verhandl. deut. pathol. Gesellsch., 1928, xxiii., 6.
Kölliker, A.: Encyclopædia of Anatomy and Physiology, June, 1849 (quoted by Gray).
Krumbhaar, E. B.: New York Med. Jour., 1915, ci., 232; and Physiol. Reviews, 1926, vi., 160.
Lieutaud: Mém. de l'Acad. de Paris, 1738 (quoted by Gray).
Mall, F. P.: Johns Hopkins Hosp. Bull., 1898; and Amer. Jour. Anat., 1902, ii., 305.
Malpighi, M.: De Viscerum Structura, 1669.
McMichael, J.: Edin. Med. Jour., 1931, xxxviii., 1.
McNee, J. W.: Quart. Jour. Med., 1923, xvi., 390.
McNee (in part with Cashin, M. F.): Glasgow Med. Jour., 1929, cxi., 65, 193, and 288.
Mills, S.: Quart. Jour. Exper. Physiol., 1927, xvi., 301.
Moynihan, Berkeley: The Spleen and Some of its Diseases, Bristol, 1921.
Pearce, R. M., Krumbhaar, E. B., and Frazier, C. H.: The Spleen and Anæmia, Philadelphia, 1918.
Pernet, G.: Brit. Med. Jour., 1896, ii., 1587.
Pliny, C.: Natural History, Translation by Philemon Holland, London, 1601, Book XI., p. 343.
Ponfick, E.: Virchows Archiv, 1869, xlviii., 1.
Ranvier, L.: Compt. rend. hebdom. de l'Acad. des Sci., 1891, cxii., 922.
Robin, P. Ansell: The Old Physiology in English Literature, London, 1911.
Robinson, W. L.: Amer. Jour. Pathol., 1926, ii., 341.
Ruysch, F.: Quoted by Gray.
Schweigger-Seidel, F.: Virchows Archiv, 1862, xxiii., 526; 1863, xxvii., 460.
Spencer, W. G.: Animal Experiments and Surgery, London, 1920.
Stukeley, W.: On the Spleen, its Description and History, Uses and Diseases, London, 1723.
Tait, J.: Brit. Med. Jour., 1927, ii., 291.
Tait, and Cashin, M. F.: Quart. Jour. Exper. Physiol., 1925, xv., 421.
Thoma, H.: Verhandl. Anat. Gesellsch., 1895.
Tigri, A.: in Stricker's Manual of Histology, 1847, i., 362.
Valdoni, P.: Policlinico. (Sez. Chirurg.), 1929, xxxvi., 137.
Warthin, A. S.: Internat. Clinics., 1910, iv. (20th series), 189.
Wells, T. Spencer: Med. Times and Gaz., 1866, i., 2.
Whiting, A. J.: Trans. Roy. Soc. Edin., 1896, xxxviii., 253.
Young, R. A.: Jour. Physiol., 1892, xiii., 332.
Zambeccari, J.: Experimental Excision of Abdominal Viscera in a Letter to Redi. See Le Clerc and Manget (Clericus et Mangetus), Bibliotheca Anat., Geneva, 1699, ii., 1202 (quoted by Spencer).

REBUILDING OF CORBETT HOSPITAL.—It has been decided to rebuild Corbett Hospital, Stourbridge, in sections, and the first unit, on a site a short distance from the present buildings, is to be erected at once. The new block will have accommodation for 18 adults and 10 children and the cost will be £24,000, the greater part of which is already available.

NON-OPERATIVE TREATMENT OF THE SENILE PROSTATE.

BY J. CURTIS WEBB, M.B. CAMB.,
CONSULTING RADIOLOGIST, GLOUCESTER ROYAL INFIRMARY
AND
STUART LESLIE MUCKLOW, M.B.MANCH., D.M.R.E.,
HON. RADIOLOGIST, CHELTENHAM GENERAL AND EYE HOSPITAL.

THE changes in the prostate in the later years of life may be considered analogous to the climacteric changes in the female generative organs, and it appears somewhat of a slur on our profession that most medical practitioners have but one of two alternatives to offer to patients consulting them for the symptoms associated with senile prostate: either the horrors and risk of a catheter life, or the more serious procedure of surgical operation. The object of this communication is to draw attention to the treatment of the senile prostate by deep X ray therapy, or by diathermy plus static wave, or a combination of the two.

We fully recognise the wonderful results of prostatectomy in a large number of these patients, and we consider that, at the present day, it is indubitably the indicated treatment in a certain type of case. At the same time it is well recognised that operation often only gives partial relief, while in some instances complications or shock leave the sufferer even worse than he was before. The operation is far from being free of risk to life. The age of the patient is itself a source of danger. Sir John Thomson-Walker, in last year's Lettsomian lectures,[1] gives the mortality from 11 great general hospitals in different parts of the country from 1918–28 as 19·5, and in his own private practice as 6 per cent.

Ætiology of Prostatic Enlargement.

Kenneth Walker writes[2]: "All that can be said with certainty is that every cause that has yet been suggested is either definitely wrong or else insufficient alone to explain the facts."

There are two distinct types of simple senile prostate: the large elastic or soft, and the small hard. The problem requiring solution is whether these are completely separate conditions, or whether there is always a preliminary increase in the adenomatous elements with subsequent replacement of the glandular portion by fibrous tissue. The microscopic changes are very similar to those which occur in the female breast at the menopause—distension of the alveoli, tendency to develop intra-acinous growths as the result of epithelial proliferation, patchy distribution of these changes, and absence of round-celled infiltration. Whatever the origin may be, simple enlargement of the prostate resembles, in its gross and histological characters, an adenoma with a varying amount of cystic formation. It is therefore justifiable to assume that the soft hypertrophied prostate is definitely adenomatous and characterised by the new formation of epithelial cells. The absence of any round-celled infiltration would tend to disprove the contention of Chiechanowsky that inflammation is the primary cause of all senile prostates.

The explanation of the fibrous prostate, however, offers greater difficulties, and we venture to put forward the hypothesis that this form is the result of inflammation which may occur in two distinct ways. Firstly, an adenomatous condition may start in the prostate, resulting in a dilatation of the

ducts of the peri-urethral glands whereby sepsis may invade the prostate from the urethra. A hyperplasia ensues, followed by the usual overgrowth of connective tissue and a final obliteration thereby of the glandular tissue, the end-result being that the gland becomes more or less a complete mass of fibrous tissue. On the other hand, excessive fibrous tissue may result from the irritation of chronic prostatitis brought about by causes such as excessive riding or bicycling, masturbation or sexual excess, or chronic gonorrhœa or other infection. Such a hypothesis as this is but a development of Ciechanowsky's theory, and puts aside the suggestion of Lannois that the condition is a degenerative fibrosis due to arterio-sclerosis—an explanation that is not accepted by such authorities as Thomson-Walker, Kenneth Walker, and Caspar, and Motz.

The symptoms are so well known that it is not necessary to enlarge on them, except to say that the early symptom of frequency is almost certainly due to nerve irritation associated with a hyperplasia of of the lining epithelium of the prostatic urethra and internal sphincter of the bladder, analogous with the symptoms of congestion of the mucous membrane over a deflected nasal septum. This explains why a large prostate may give rise to no symptoms and why, on the other hand, there may be definite urinary symptoms with little tumour formation (J. Lazarus [3]).

Principles of Non-operative Treatment.

The treatment of senile prostate by deep X rays, in combination with diathermy and static wave applications, is based on the following principles, which are well recognised.

(1) The selective action of rays of short wave-length in destroying newly formed cells and leucocytes.
(2) The effect of diathermy in promoting increased circulation in the part treated.
(3) The action of the Morton wave current in causing cellular contraction (histological massage) and thus aiding the increased circulation to get rid of the debris of the cells destroyed by the X rays.

It is remarkable that, whereas the medical literature of France, Germany, and America teems with articles from well-known workers approving radiotherapy for the senile prostate, hardly a reference can be found to it in the literature of our own country, except in two papers by Mr. T. E. Hammond [4] and Dr. Howard Humphris.[5]

It would be impossible to epitomise all the articles recently written on this subject, but a few are significant.

Boit [6] (1928) describes 58 cases (12 in the first stage, 13 in the second stage, 33 in the third stage), of whom 48 showed normal function of the bladder after X ray treatment. After two and a half years he traced 24 cases, all of whom remained cured. He considers radiation the method of choice for cases in the first stage, and both he and Hinze advocate it for old people.

Guilbert (Paris) reports 43 cases with 34 cures, one relapse, and five subsequent operations.

Joachim Fürstenau [7] describes his experiences at length. He discusses 59 cases (13 between 69 and 70; 27 between 70 and 80; 17 between 80 and 90; and two between 90 and 100), going in great detail into the condition of each, and states that 55 were cured or immensely relieved by irradiation.

Devois [8] writes of his favourable results and says that the treatment is especially indicated in cases where there are emphysema, chronic bronchitis, valvular or myocardial troubles, high arterial tension, diabetes, hæmophilia or old age, or where operation is refused by patient or relatives.

Guyon is equally enthusiastic, as are Thomas and Giles,[9] Pilger,[10] and Lazarus.

Ledoux-Lebard [11] (1924) critically examines the treatment and says that, though it is possible to get some relief by using the rays from ordinary X ray apparatus, immeasurably better results are obtained from a tube passing very hard rays (200 k.v.). With apparatus which will only pass currents not exceeding 130 k.v., the extra time of exposure required and the comparative thinness of the filter introduce an element of risk of damage to the intervening tissues and, owing to the rays not being sufficiently hard, an adequate dose does not reach the prostate. He issues the warning that at first symptoms may be increased from congestion, but that these can be overcome and then relief is obtained. He urges the wisdom of repeating the treatment at intervals

In addition to the above we have found over 20 articles on the subject in foreign literature, couched in the same favourable language.

REASONS FOR NEGLECT OF RADIOTHERAPY.

We cannot but feel that the unfavourable light in which many genito-urinary specialists in this country view the treatment is due first to faulty technique, secondly to insufficient care in selecting suitable cases, and thirdly to a misconception as to certain effects which may follow the treatment but which, though *post*, are not necessarily *propter hoc*.

(*a*) Some surgeons have stated that X ray therapy makes a subsequent prostatectomy more difficult owing to fibrosis. Kenneth Walker, though writing unfavourably of the treatment (after an experience with X rays in five cases only), states: "It does not interfere with enucleation should this become necessary." This view is borne out by all foreign authorities, and Sir James Berry informs us that he has not found that radiotherapy increases the difficulty of subsequent operation for exophthalmic goitre. He further agrees with us that, when an operation was difficult owing to fibrosis, the fibrosis was a factor of the disease and not the result of antecedent X rays.

(*b*) Retention has occurred immediately after treatment. This is due to a temporary congestion that frequently takes place after adequate X ray dosage and, though catheterisation may be necessary for a few days, benefit is usually noticed as soon as the congestion subsides.

(*c*) Rectal ulceration, or other X ray damage, is just as much a fault of overdosage as in any other part of the body and, except in an extraordinarily radio-sensitive patient, ought not to occur.

(*d*) The possibility of damaging the skin at the site where an incision would be made in a subsequent prostatectomy is fully discussed under the heading of technique, and can easily be avoided.

(*e*) A much more difficult question to decide is whether or not to remove all senile prostates, considering that it is stated that 16 per cent. of glands removed for simple enlargement have been found to show malignant changes. Now the mortality from prostatectomy is so high that the risk of operation would seem to balance the danger of malignancy. On the other hand, we have in X ray therapy a form of treatment without risk and one which will be beneficial even if cancerous cells are already present. We cannot but feel, therefore, that in cases where examination does not give rise to any suspicion of the presence of malignancy and where other factors indicate that radiotherapy can be employed with reasonable anticipation of success, it is right to recommend such treatment. The possibility of latent early malignancy is another strong argument for the use of the most deeply penetrating rays.

Indications and Technique.

The treatment is indicated for all early cases, and for later cases when there is no large amount of residual urine (i.e., exceeding 2–3 oz.) and no definite enlargement of the gland into the bladder, as shown by cystoscopy. These signs, as well as evidence of back pressure on the kidney and the

presence of cystitis, are contra-indications. Joachim Fürstenau, of Königsberg, employs radiation even where there is cystitis, after washing out the bladder for a time and administering urotropin.

Where benefit results from treatment it is important that the patient should have a further series if the symptoms return (which they not infrequently do, as the condition is progressive). It is quite possible to keep them in abeyance almost indefinitely by this treatment.

The present method is to work at 200 k.v. (kilovolts) and to attack the gland through the perineum, two inguinal fields and two fields on either side of the coccyx, making five fields in all. Four-fifths only of the unit skin dose is given to the perineum, the skin in this region being usually moist and rather liable to damage by the rays; the full dose is given to the other four fields. Recognising the risk of damaging the skin for subsequent operation we protect a central strip of the abdomen, 3 in. wide, from the symphysis to the umbilicus, and only direct the ray through the inguinal regions. For access to the perineum we seat the patient on a special stool, similar to an office stool in form and height, a chair placed in front of it serving as a foot-rest. This special stool has an aperture about $10'' \times 6''$ cut in the seat and the X ray tube is placed beneath the seat, the compressor pointing upwards through the opening. The top of the stool, excepting for the aperture, is completely covered with lead rubber, while a piece of the same material hangs down in front to protect the patient's legs. The advantages of this method are obvious: the buttocks are held widely separated, permitting ready access to the perineum; the patient is comfortably seated instead of lying in the lithotomy position; and there is no possibility of sparking from the ends of the tube into the patient. A filter of ½ mm. zinc—4 mm. aluminium and a focal surface distance of 30 cm. are used.

In treating the lateral fields we use a modification of the method devised by Chaoul which entails the use of two special pieces of apparatus.

The first consists of a wooden box, $15'' \times 15'' \times 12''$, the lid of which carries a fluorescent screen, action side facing inwards. The side of the box is open and a mirror is fitted in it at an angle of 45°, so that the image of the fluorescent screen can be easily seen through the open side. The second requirement is a lead ball about ¾ in. diameter which is soldered on to a piece of stiff copper wire about 6 in. long. The room is darkened and the following procedure is carried out, using the minimum amount of artificial light. With the patient lying on his side the lead ball is inserted into the rectum to such a distance that it comes in contact with the prostate. The patient then turns on his back and the tube is centred over Poupart's ligament, being inclined so as to direct the rays slightly inwards. The Chaoul box is then placed under the couch directly beneath the prostate area, and a small current is passed through the tube. All lights are now extinguished, and the operator, lying on his side, looks into the Chaoul box, where he can see the map of the fluorescent screen illuminated by the rays. Wearing a lead rubber glove to protect his hand, he moves the carrier until the shadow of the lead ball appears in the centre of the field, when the central ray will be passing through the prostate gland. This aim is greatly facilitated by the use of a flat diaphragm of thick lead with a central opening 1 in. in diameter, which is slipped inside the compressor ordinarily used for treatment. A small circular field of illumination is thereby obtained, making the localisation more exact, and the shadow of the lead ball more clearly visible. This adjustment having been effected (and it should only take a minute or so), the compressor is brought down on to the patient, using as much pressure as can be tolerated. The lead diaphragm and ball are then removed and the treatment given. Care must be taken not to forget to remove the lead ball, as it would form a centre of strong secondary radiation which might easily lead to ulceration of the rectum. This method is employed in the treatment of both inguinal and coccygeal fields. In both cases a filter of ½ mm. zinc—3 mm. aluminium is used. The front is treated at 30 cm. focal surface distance, and the back at either 23 cm. or 30 cm. focal surface distance, according to the thickness of the patient.

The supplementary diathermy and static applications begin as soon as the radiotherapy is completed and are given daily or on alternate days over a period of three weeks. For the diathermy we use a rectal electrode similar to that devised by Cumberbatch, while the other electrode is placed just above the symphysis and over the area of skin which was protected during the radiotherapy, the skin which has been subjected to the rays being thereby avoided. For the static wave applications it is necessary to use a machine capable of generating a satisfactory charge at slow rotation, and it is important to treat with slow impulses using the maximum length of spark obtainable.

In cases where the prostate is small and hard it is often sufficient to use only the combination of diathermy and static wave, as radiotherapy has but little effect on the purely fibrous prostate.

The general results that we have obtained in the treatment of simple senile prostate have been so encouraging that we have summarised the 16 cases that we have had the opportunity of treating. While it may be said that the number is small—and it is indeed so in comparison with those of some of our Continental colleagues—we bring them forward in the hope that some serious attention may thereby be drawn to this form of treatment, and also that some of our own colleagues may be persuaded to enter the lists and give their experiences of the treatment of the condition by X rays and other electrical methods.

Cases.

CASE 1.—Age 72. Very large elastic prostate with early symptoms of retention and residual urine about 5 oz. Frequency two-hourly day and night. State of heart contra-indicated operation. Both frequency and retention much improved for five months subsequent to treatment; then, following a motor accident, the patient's nerves were much shaken and the symptoms were aggravated. A further course of X ray, diathermy, and static wave were given and he improved for eight months; then, the retention getting worse, he was operated on with complete success. The surgeon said that there was no evidence to suggest that the radiotherapy had caused fibrosis. Although a successful result was in this case doubtful from the start, owing to the retention and large quantity of residual urine with almost certainly a large middle lobe, the patient wished to try anything rather than be operated on—a view in which the surgeon concurred.

CASE 2.—Age 77. Large medium-hard prostate. Frequency two-hourly at night, four to five times during the day. Was catheterised every week. After treatment much improved. Frequency twice at night. A year later he reported that improvement was maintained unless he did horse-riding. He has now left the neighbourhood and we cannot trace him, but 18 months ago—i.e., four years after treatment—we learned that he was going on well and that his general health was excellent.

CASE 3.—Age 65. Large elastic prostate, no evidence of retention. Residual urine about 2 oz. Day and night frequency. He was treated in 1924. This year he writes: "I have never ceased to be thankful that I underwent the treatment instead of operation. I generally go through the night without being disturbed." His general health is much improved.

CASE 4.—Age 78. Large hard prostate. Evidence of commencing retention and some residual urine. Frequency five times at night and two-hourly by day. Had monthly catheterisation. Two years after treatment his doctor reported that on the rare occasion when he passed a catheter it went in quite easily, whereas previously there had been great difficulty, and that the frequency was now only twice a night and the patient could hold water for three and a half to four hours by day. Shortly after this report he died of heart trouble.

CASE 5.—Age 60¼. Increased frequency by day and night with difficulty in starting. Prostate large, smooth, and elastic. In 1928 (four years after treatment) patient came to report that he had been much better but that he

thought symptoms were returning. Treatment was repeated and benefit has lasted till now.

CASE 6.—Age 67. Frequency three to four times at night, two-hourly by day. Some pain. Prostate not much enlarged; smooth, flat, rather hard. Treated in 1927. Reports in 1930 that the day and night frequency is much less and the improvement is maintained, and adds, "I have derived very great benefit from the treatment."

CASE 7.—Age 69. Prostate rather hard, not enlarged. Frequency three times at night and about six times during day. Occasional slight hæmorrhages. Treatment in 1925. He now reports that he has been much better since and that, although on some days he passes more water than on others, there is no discomfort or inconvenience. He hunts regularly.

CASE 8.—Age 67. Had several attacks of hæmaturia. Prostate enlarged and soft. Neither X ray nor cystoscopic examination revealed the cause of the bleeding. No *B. coli*. Slight frequency, though not very marked. Treated 1928. From then up to last June there was no bleeding, and the patient writes: "There was no doubt as regards frequency that this trouble was lessened after the treatment." Since June he has been again cystoscoped, and there are fears that the cause is malignant disease of the bladder.

CASE 9.—Age 78. Prostate very large, smooth, elastic. Frequency three or four times at night, very often in the day. Residual urine 2½ oz. Treated 1928. After a year he reported: "Can sleep all night without being disturbed. Much less frequent by day. Feeling very well." This improvement is still maintained.

CASE 10.—Age 72. Prostate large and soft. Residual urine 2 oz. Day and night frequency marked. Treated April, 1928. Immediately after the treatment the frequency increased. Various means were tried, but in June he got acute retention; cystotomy and subsequent prostatectomy were necessary. It is very difficult to trace the relation between the treatment and subsequent events, for the retention in June could not have been due to prostatic congestion from the radiation, as the interval of time was too long. It was the breaking-down of the wound after operation in this case that made us abandon the suprapubic route in raying the gland.

CASE 11.—Age 72. Prostate enlarged, elastic. Some day and night frequency. Treated May, 1929. We heard that he was relieved and in much better health after the treatment.

CASE 12.—Age 61. Prostate rather small and hard. Frequency about three times at night. Treated May, 1929. Reports that he now gets up twice instead of three times at night, but otherwise not improved.

CASE 13.—Age 79. Prostate rather small, hard, smooth, not tender. Frequency four to five times at night. Every two hours by day. Pain and difficulty in starting. Treated June, 1929. In October, 1929, reported "infinitely better in every way." Now there is no pain or discomfort and flow starts much more easily. Frequency is less, and general health is excellent.

CASE 14.—Age 78. Prostate enlarged. Frequency three times at night and very often during the day. Heart and lung condition contra-indicated an operation. Treated February, 1929, but died in October from pyelonephritis and uræmia. His son, a medical man, wrote: "He certainly had been more comfortable since the treatment and only had to be catheterised at long intervals."

CASE 15.—Age 78. Prostate large, hard, smooth. Difficulty for some years. Frequency seven to ten times at night and one and a half to two hours by day. No X ray evidence of stone. Treated by diathermy and static wave only in April, 1930. After 12 treatments flow started easily. Frequency was only once or twice at night, and he could go three hours during the day. This month he reported that there is no relapse and he can shoot two or three days a week.

CASE 16.—Age 79. Pain and difficulty on micturition for 12 months. Frequency six to seven times at night and two-hourly by day. Treated by diathermy and static alone in June, 1930. Writes this month: "I am considerably better, nights much freer from trouble, and I am feeling more like I was a year ago before the prostatic trouble began. If I should relapse I shall call on you once more for your help."

Summary.

1. Surgical interference is called for in all cases of senile prostate where there is much residual urine, definite enlargement into the bladder as proved by cystoscopic examination, cystitis, or evidence of back pressure affecting the kidney.

2. Where the above conditions are not present, deep radiotherapy with or without diathermy and static wave is to be employed. In cases of small hard fibrous prostate the last two forms of treatment alone often give the best results. The non-surgical methods are also indicated: (*a*) in early cases; (*b*) where the heart, lung or general condition, or age of the patient, contra-indicates operation; (*c*) where the patient or his friends are unwilling for surgical interference unless absolutely necessary.

Where relief has been obtained it is important that the patient be kept under regular periodic observation; for the condition is a progressive one, the symptoms may recur, and further application may be necessary to keep the progress of the malady in check.

No mention has been made of ultra-violet therapy or prostatic massage, since the treatment described above is regarded by us as infinitely superior.

REFERENCES.

1. Thomson-Walker, J.: THE LANCET, 1930, i., 1163, 1219, and 1273.
2. Walker, K.: The Enlarged Prostate, London, 1926, p. 24.
3. Lazarus, J.: Jour. Urol., 1927, xvii., 37.
4. Hammond, T. E.: Brit. Med. Jour., 1926, i., 94.
5. Humphris, F. H.: Ibid., 1928, ii., 221.
6. Bolt, H.: Arch. f. klin. Chir., 1928, clii., 222.
7. Fürstenau, J.: Deut. med. Wch., 1928, liv., 1624.
8. Devois, M.: Jour. de radiol. et. d'électrol., 1923, vii., 400.
9. Thomas, G. F., and Giles, R. G.: Radiology, 1924, ii., 90.
10. Pilger, W.: Jour. of Cancer (Dublin), 1926, iii., 31.
11. Ledoux-Lebard, R.: Paris Méd., 1924, ii., 115.

CAVERNOUS SINUS THROMBOSIS: A FATAL COMPLICATION OF MINOR FACIAL SEPSIS.

BY W. G. SCOTT BROWN, M.B. CAMB., F.R.C.S. ENG. & EDIN.,
MEDICAL OFFICER, SEVENOAKS HOSPITAL.

THE present series of six cases of cavernous sinus thrombosis is collected from the records of St. Bartholomew's Hospital for the period 1922 to 1930. Three of the cases are described at some length, though only one case came under my direct care. This condition was first described from post-mortem findings by Abercrombie (1818) and Duncan (1821). The first clinical record was made by Vigla (1839). The differential diagnosis was discussed by Knapp in 1868, while Dwight and Germain (1902) were the first to attempt surgical treatment. Up to the present about 350 cases have been recorded, and in a series of 140 cases collected by Dorland Smith (1918) 35 per cent. were due to infection of the face or orbit with a spread to the cavernous sinus through the ophthalmic veins. A further 40 per cent. were secondary to ear infections, 13 per cent. to infections of the mouth and throat, 9 per cent. to the nose, and 32 per cent. to other causes. Only cases falling into the first group are discussed in this paper.

Anatomy.

The anatomy and the connexions of the cavernous sinus are a matter of the first importance in understanding the pathology, symptomatology, and treatment of this condition. Roughly quadrilateral in shape, tapering from behind forward and about 2 cm. in length, the cavernous sinus is situated on each side of the body of the sphenoid and extends from the sphenoidal fissure in front to the apex of the petrous portion of the temporal bone behind. Above and to the outer side is the temporosphenoidal lobe, while the optic tract, the crus, and the pons are

superior relations. In the adult the cavernous sinus is only separated from the sphenoidal air sinus by a thin plate of bone. The sinus is trabeculated and contains the carotid artery and the sixth nerve, which lie on its internal aspect against the wall of the sphenoidal air sinus. The third, fourth, and fifth nerves run forward to the sphenoidal fissure in the external wall.

The cavernous sinus on each side receives blood from the middle cerebral veins, the sphenoparietal sinus, the veins from the sphenoidal air sinus, and from the superior and inferior ophthalmic veins. A communicating vein joins the superior ophthalmic to the angular vein, which is often of considerable size. The angular vein is formed by the junction of the supra-orbital and frontal veins and is continued down the side of the nose as the anterior facial vein, which is joined by many small tributaries from the subcutaneous venous plexus on the side of the nose. Other connexions of the cavernous sinus are mainly efferent channels, though this by no means precludes these channels as routes of spread of thrombosis. The superior and inferior petrosal sinuses pass from the cavernous to the lateral sinus, and emissary veins pass through the base of the skull to join the pterygoid venous plexus, which provides an indirect communication between the cavernous sinus and the soft palate, fauces, and pharynx, and the alveolar processes of the upper and lower jaws. The circular sinus connects the cavernous sinus to that of the opposite side.

In the cases under consideration the connexions which carried the infection are those from the face, and particularly from the nose and upper lip, by way of the subcutaneous plexus and the angular and ophthalmic veins. Logan Turner (1926) demonstrated by a series of sections through the nose, orbit, and the base of the skull that the spread from the nose to the cavernous sinus took place by this route; this was confirmed in the present series by a dissection of the veins in Case 1, sections being taken at intervals to confirm the thrombosis, which could be seen macroscopically.

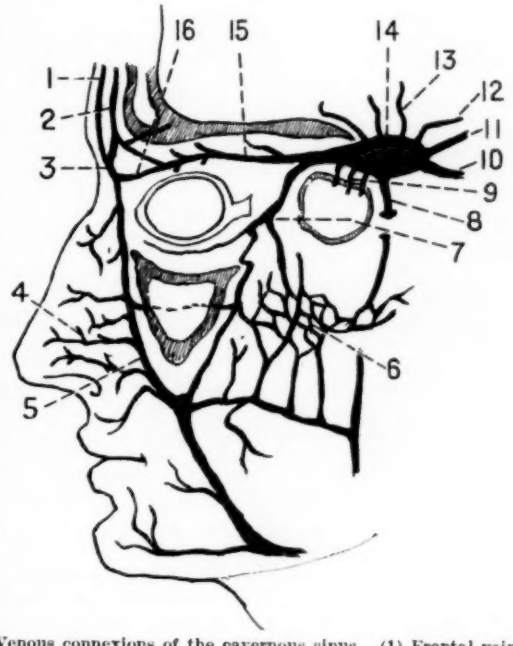
Pathology.

The process of thrombosis in a vein or a venous sinus depends upon three factors: degenerative change in the vessel wall, sluggishness of the blood stream, and pathological changes in the blood. These factors are intimately related, though in various conditions one may stand out above the rest. Thus slowing of the blood stream and impaired vitality of the vessel endothelium are of chief importance in the formation of a simple thrombus, whereas in the infective variety it is the organisms or toxins in the blood which are the determining factors in the thrombosis.

The spread of infection from the septic focus to the sinus may take place in three ways. Firstly, a clot may form in a vein near to the focus; infection follows, giving rise to a further spread of thrombosis. Secondly, there may be a diffusion of toxins along the perivascular lymphatics, with a transmural spread to the endothelium of a vein or sinus. Lastly, a particle of a thrombus which has reached a tributary may be dislodged and carried to the sinus as an embolus. However the clot forms, it eventually becomes infected and pus is formed which, if carried into the general blood stream, gives rise to pyæmic abscesses in the various organs of the body.

From the material collected in this series of cases it is impossible to say by which method the infection spread, but from the dissection of the veins of the nose and orbit in one case (Case 1) it was obvious that the process was one of direct spread by the lumen of the vein or by the lymphatics, as in all the areas involved the veins contained blood-clot or pus which was continuous from the angular vein to the cavernous sinus. Further, in Case 2, the vessels in the meninges showed the spread of infection taking place by the perivascular lymphatics. Sections made from the less damaged inferior ophthalmic veins showed a marked perivascular infiltration by polymorphonuclear cells and organisms. The latter could be seen in the endothelium of the veins, and a few in the lumen. In

FIG. 1.



Venous connexions of the cavernous sinus. (1) Frontal vein; (2) supra-orbital vein; (3) angular vein; (4) nasal vein; (5) anterior facial vein; (6) pterygoid venous plexus; (7) inferior ophthalmic vein; (8) vein of Vesalius (inconstant); (9) veins from sphenoidal air sinus; (10) inferior petrosal sinus; (11) superior petrosal sinus; (12) sphenoparietal sinus; (13) middle cerebral sinus; (14) cavernous sinus; (15) superior ophthalmic veins; (16) communicating vein.

Cases 1 and 2 a similar condition could be made out in the cerebral veins which were in close relation to the cavernous sinus. This suggests that the method of spread in venous thrombosis is lymphatic diffusion of the toxins, but the fact could only be demonstrated by obtaining from a case a series of sections which would show a point reached where there would be either perivascular inflammation but no endothelial change, or endothelial damage and thrombosis which had outstripped the perivascular spread.

Any of the areas drained by the cavernous sinus may be the site of infection giving rise to a septic thrombosis. Infection may spread from the middle ear by way of the lateral sinus, from the sphenoidal and ethmoidal air cells, from the mouth, tonsils and teeth, from osteomyelitis of the diploë and, as in the cases at present under consideration, from minor sepsis on the face.

In the six collected cases, the primary focus was a nasal furuncle in two, an infected insect bite on the nose in one, an infected cut on the nose from a stone chip in one, and a carbuncle on the upper lip in two cases. In three cases the nature of the infection was investigated and found to be staphylococcal,

as would be expected. In each of the six cases the body reacted to the local bacterial irritation by the usual processes of inflammation. The failure on the part of the protective mechanism to shut off the infection completely may have been due to several factors. Poor resistance on the part of the patient would favour a spread of infection, but was not present in all the cases. The virulence of the organism is an important factor. The absence of valves in the angular and ophthalmic veins and the large size of the angular vein makes the route easy for spread to take place. It is noticeable that the cases of severe open lacerations of the face and nose, in which there is a mixed infection of staphylococci, streptococci and other virulent organisms, are not complicated by cavernous thrombosis; it is the furuncle or its counterpart—usually small and often staphylococcal—which appears to favour this serious complication. The difference in the conditions seems to lie in the diffusion of toxins at considerable pressure from the abscess cavity, when such pressure has not been relieved by adequate drainage. The fact that the results of incision appear to favour the spread of thrombosis is discussed below.

Once thrombosis of the blood in the sinus has taken place, the spread of the infection with pus formation rapidly follows, and the recovery of the organisms from the circulating blood or even from the urine is an indication of the pyæmia resulting from a failure to shut off the infection in the vein. This is confirmed at post mortem by evidence of pyæmia as shown by pyæmic abscesses, which are eventually present in many organs in all cases which survive long enough. The presence of organisms in the cerebro-spinal fluid indicates the direct spread to the meninges.

Signs and Symptoms.

The first symptoms suggesting a serious complication of a small infective focus on the face are malaise and headache. Case 1 was a child who had been stung on the nose by an insect, and the doctor was consulted because of the headache. An incision was made, but she still complained of severe headache which became steadily worse. Case 2, a railwayman, who had been injured on the nose by a splinter of stone, complained two days later of a "septic place" and headache. He came to hospital next day because he was alarmed about the frontal headache, which had become more severe. He died 48 hours later. The headache is usually frontal, but may radiate to the occiput or be situated over the mastoid process.

Pyrexia is a constant feature. In three of the cases a temperature of 100–101° was noted by the doctor, and in all cases 101–106° was recorded in hospital. The pulse-rate is often not very much raised to begin with, but later usually rises to 120. The white blood count is raised, and increases as the invasion progresses. If the white count falls the prognosis becomes very grave, as this indicates a failing resistance.

Vomiting and rigors are by no means constant, and in only one case was vomiting an early symptom. Rigors occurred in one case at an early stage, but both symptoms were present in the advanced stages in association with a general pyæmia. Drowsiness was present in two cases as an early symptom, but was accompanied by restlessness or delirium at night.

The most important local signs are found in the eye. Orbital cellulitis is one of the first to be seen, but does not give definite evidence of intracranial disease, as it may be due to a spreading cellulitis in the soft tissues around the septic focus. Marked conjunctival œdema is more suggestive, whereas proptosis and chemosis are definite indications of a retro-orbital thrombosis. Corneal ulceration and any internal or external ophthalmoplegia are due to interference with the fifth or with the third, fourth, and sixth nerves in relation to the sinus and, if found accompanying the other symptoms make a diagnosis of cavernous sinus thrombosis certain. It is interesting to note that the earliest paresis is often of the external rectus, due to the position of the sixth nerve within the sinus. Papillœdema may be found, though it is often impossible to see the retina because of the difficulty of looking through a misty cornea. The patient usually dies before papillœdema develops, but an examination should always be made, as venous congestion, thrombosis, or hæmorrhages may be seen. The pupil is at first small but later is fixed and dilated. Vision often fails early, owing to the pressure on the eyeball or stretching of the optic nerve.

Later signs and symptoms are in the main those of the complications. Accompanying a spread of infection to the lateral sinus is an increased probability of rigors, with pain behind the ears and tenderness along the line of the deep cervical glands. Signs of inflammation seated deeply in the neck may be due to a spread of thrombosis to the internal jugular vein, to perivascular inflammation, or even suppuration in the carotid sheath (see Case 1). Meningitis is almost invariably present as a terminal event and was found in the four cases on which a port-mortem examination was performed. Pyæmia was observed in two cases though it was only recognised clinically in one case.

The cerebro-spinal fluid is found to be under pressure and opalescent, with a diminished sugar content. It contains many polymorphonuclear leucocytes and cultures yield staphylococci.

Differential Diagnosis.

The diagnosis of cavernous sinus thrombosis does not usually present any difficulty when once the condition is established. In the early stage the severe headache, and later the proptosis and chemosis, are a guide. The following conditions may present difficulty in diagnosis.

Orbital cellulitis occurs as a complication of infections of the nose and upper lip and may be followed by thrombosis of the sinus. The signs of swelling of the lids, redness, conjunctival œdema, and conjunctivitis are common to both conditions but proptosis does not occur until the sinus is involved.

Meningitis rapidly complicates sinus thrombosis and may largely overshadow its signs, but the condition of the orbit and eyes differs from any primary meningitis.

Sphenoidal sinusitis may simulate sinus thrombosis very closely, and in one case seen recently there was headache, a raised temperature and pulse, and œdema of both eyelids, and on the second day proptosis of the right eye. The condition cleared up completely after exploration and drainage of the sphenoidal and ethmoidal cells. It is obviously of the greatest importance to decide between these two conditions, and the sinusitis can only be diagnosed by careful examination of the nose assisted by transillumination, radiography, and if any doubt still exists by exploration of the sinuses.

Pulsating exophthalmos is said to be caused by

thrombosis of the cavernous sinus. It must be a very rare sign, and if it does occur the other causes need not be considered, as they are all chronic or non-infective conditions.

Treatment and Prognosis.

Septic thrombosis of the cavernous sinus is invariably fatal unless the actual sinus is drained. Bircher (1893) reported one case which he drained successfully by boring through the petrous portion of the temporal bone. The importance of early diagnosis and focal treatment becomes obvious, owing to the lack of success of radical treatment, in spite of many attempts by many different routes. Once the sinus contains an infected thrombus, however, drainage gives the only hope of recovery. There are several possible routes of approach.

First, there is the Hartley-Krause Gasserian ganglion route, of which the most obvious disadvantages seem to be the risk of meningitis if it does not already exist and the fact that the sinus has to be incised in the wall that contains the important structures. Attack through the orbit is possible but only at the sacrifice of structures in the sphenoidal fissure, so that this method would be of use chiefly in cases in which the orbit was the primary focus. Approach through the petrous bone, though giving the only reported success and showing that recovery may be effected by bold treatment, is an extremely severe operation and leaves the patient deaf and with a facial paralysis. A nasal approach, through the wall of the sphenoidal air sinus, described independently by Luc in France and Grunert in Germany, offers the greatest likelihood of success. The sphenoidal air sinus can be drained comparatively easily, and through the superolateral wall the cavernous sinus can be reached without great risk of injury to important structures such as the carotid artery or sixth nerve and to a lesser extent the third, fourth, or fifth nerves, and again the risk of meningitis as a result of operation is diminished. By operations on the cadaver it has been shown by these observers that an approach through the canine fossa and maxillary antrum of one side into the sphenoidal sinus of the opposite side gave a line which, after penetrating the lateral sphenoidal wall, entered the cavernous sinus, and this procedure was followed in a number of cases without injury to any important structure.

General treatment with specific antisera or vaccines may be tried, or bactericides may be injected into the blood stream. In the present series one case was treated with 10 c.cm. of mercury perchloride, 0·1 per cent., intravenously, though with no appreciable good effect.

Preventive measures, by efficient observation and treatment of all conditions liable to give rise to cavernous sinus thrombosis, are by far the most important lines of treatment. Ear infections usually come to an otologist before the cavernous sinus symptoms develop. The ethmoidal and sphenoidal air sinuses must always be remembered as a possible source of infection, and in this instance again it is usually in a special department that the condition will be finally diagnosed. It is in the cases of minor facial sepsis that the opportunity of making an early diagnosis of this severe complication may fall to the lot of any medical man. The furuncle or insect bite or other small septic focus is not serious enough to be sent away for hospital treatment; if it is already in the casualty department, the house surgeon will be in charge of the case.

In any case of minor facial sepsis, especially when the "danger area" is involved, headache should be regarded with suspicion, and if the headache is becoming worse in spite of local treatment of the focus, thrombosis of the sinus should be suspected. Giddiness or a feeling of drowsiness or dullness, and an unduly high temperature and pulse, will single out in a few months at a general hospital perhaps 20 cases of the type that may develop cavernous sinus thrombosis. Malaise is an indefinite symptom, and some authorities state that the onset is usually associated with euphoria.

Free incision and squeezing are generally recognised as dangerous and some authorities advise conservative means only. Hinton (1927) advises hot flax seed poultices and Speer (1929) advocates hot dressings of a saturated solution of magnesium sulphate. Mainzer (1930) states that "surgery of the face in minor infections is bad surgery" and recommends hot applications only.

While recognising the risk of opening up uninfected tissue and lymph spaces, and dislodging thrombi and breaking through the barrier of leucocytes, it seems obvious on general surgical principles that the pus should be evacuated at the earliest time it can be done with safety.

The following suggestions are given in detail as being safe and efficient methods of dealing with the focus, drainage being obtained without the involvement of healthy tissue.

For small septic foci about the nose and eye, puncture should be made with a sharpened match-stick dipped in liquid carbolic acid. For larger abscesses, hot applications should be employed until the first sign of pointing can be seen. The skin over this area is then removed and, if any pus escapes, a small pledget of cotton-wool soaked in 10 per cent. cocaine should be lightly packed into the cavity. A few minutes later an orange-stick dipped into *liquor hydrargyri nitratis acidus* should be gently bored into the core. Care must be taken that all bleeding has stopped and that the wound is dry before the acid is applied, as otherwise the skin may be burnt by an overflow of acid. The treatment is painful, as the acid soon burns past the cocainised area. This method rapidly improves the local condition without the danger of free incision, and may be repeated if necessary.

In the case of a neglected carbuncle of the face, particularly of the upper lip, if there be any of the warning symptoms of sinus thrombosis, the carbuncle should be excised and carbolised, and not incised with undercutting of the flaps as is often practised in order to obtain a good cosmetic result. A plastic operation can restore the lip, whereas inefficient excision and drainage may lose a life.

Six Case Reports.

CASE 1, a girl, aged 10, was admitted on Sept. 8th, 1924, complaining of "headache and swelling of both eyes." Eleven months before she had had an "abscess" in the nose following many colds. Seven months before she had had measles, and a discharge from the ear which had ceased five months earlier. Eight days previously there had been a small abscess on the nose on the site of an insect bite; five days before admission she had had sleeplessness and had been feverish; on the next day the doctor had been called in and her temperature had been 100·4° and her pulse-rate 88. She had had severe spasmodic frontal headache. There had been no sweats, rigors, or vomiting, but she had been very restless. Her eyes had appeared natural and her reflexes normal. Peripheral reflexes had been present and equal on both sides. Three days before admission the abscess had been incised and the pus evacuated One day before, at 6 A.M., swelling of the left eye had commenced and had been marked by midday. On the morning of admission there had been extensive swelling in the left orbital and temporal region. There had been muco-pus in the left conjunctival sac and some œdema of the right

lids. The temperature had been 101° and the pulse-rate had been 98. In the evening the temperature had been 103°. There had been no vomiting, rigors, or sweating.

On admission she looked ill, and lay still, moaning. She cried when handled, but would answer questions and tell her age. She complained of frontal headache. Her eyelids were bluish-red and œdematous. Her eyes were tender, more on the left than on the right. Conjunctivitis was present, but no nystagmus or ophthalmoplegia. There was doubtful proptosis of the left eye. There was tender fullness on both sides of the neck behind the angle of the jaw, decreasing downwards, greater on the left than on the right. No definite swelling was felt. The tongue was furred. A small furuncle was situated on the tip of the nose to the right side, and was discharging freely. The nasal mucosa was inflamed, but no pus or muco-pus was seen. The abdomen and limbs showed nothing abnormal. Reflexes were present and equal.

Examination of the eyes showed the right cornea clear but a vitreous haze; a slight degree of papilloedema was present. The left disc was not seen owing to corneal

FIG. 2.

Photograph taken on Sept. 9th. The infected insect bite can be seen on the right side of the tip of the nose and is surrounded by an area where the skin is dry and scaly. The left eye is proptosed, the conjunctiva is projecting through the palpebral fissure, it is plum-coloured and there is a serosanguineous discharge trickling from the eye. The right eye is proptosed to a lesser degree than left though seen more clearly in the photograph. The œdematous condition of the forehead may be made out immediately above the bridge of the nose and is continuous with swelling of the forehead.

mistiness. The left maxillary antrum was opaque to transillumination but the frontal sinuses appeared normal. Nothing abnormal was discovered in the urine.

On the next day the swelling increased, extending up into the scalp for two inches. On the left it was limited by the attachment of the temporal fascia, and on the right it had spread from the orbital region to the area in front of and below the ear. There was extreme tenderness over this area but not over the mastoid process. There was no redness of the skin and the superficial veins were not engorged. Œdema of the eyelids was very marked. There was proptosis of both eyes, more marked on the left than on the right. Chemosis was present, the conjunctiva being extruded through the palpebral fissure on the left side. Swelling extended down the neck and obliterated all the fossæ on the left side of the face. There was extreme tenderness.

X ray examination showed the left antrum opaque. The ethmoidal cells were hazy on both sides, more markedly so on the left. The frontal, mastoid, and sphenoidal air cells appeared clear. The temperature was 103° and the pulse-rate was 128. At 4 P.M. rigidity of the neck was present. Reflexes were absent in the upper and lower limbs and in the abdomen. The Babinski response was extensor on both sides and Kernig's sign was positive. Lumbar puncture yielded 20 c.cm. of opalescent cerebro-spinal fluid under pressure; its withdrawal was followed by improvement in the pulse and more regular breathing. The cerebro-spinal fluid clotted in 15 minutes. There was an increase of albumin and a slight increase in the globulin; Fehling's solution was not reduced. The blood count revealed 7800 white cells and over 1500 polymorphonuclear leucocytes per c.mm. Staphylococci were found in films and cultures.

On the next day there was left hemiplegia. There was marked chemosis in both eyes and a serosanguineous discharge. Proptosis had increased. The left inferior nasal fossa contained blood-stained pus. On Sept. 11th the temperature was 104° and the pulse-rate 140. The patient died at 5.45 P.M.

Post-mortem Examination.—A diagnosis of furuncle of the nasal skin, cavernous sinus thrombosis, meningitis and pyæmia was made. The right orbit was removed intact, including the cavernous sinus posteriorly, and the angular vein and skin of the nose anteriorly. It was hardened in formalin and a dissection made at a later date. The superior ophthalmic vein was dissected from the angular vein to the cavernous sinus as it lay deep to the superior rectus and the levator palpebræ superioris. It was filled with greenish-yellow pus and was bathed in pus in places, the wall of the vessel having broken down. The inferior ophthalmic vein showed areas of thrombosis, though it mostly contained pus.

There was meningitis at the base of the brain and over the right motor area. The veins on the surface of the dura were thrombosed and the middle meningeal vein on the left side contained pus. Both cavernous sinuses and the circular sinus contained pus. The lateral sinus and jugular bulb were not thrombosed. The left carotid sheath was bathed in thick green pus, which had apparently spread from the pharyngeal plexus of veins. The superficial veins of the forehead, when cut across, were seen to be filled with pus. The heart, lungs and kidneys showed small abscesses.

Microscopic examination showed that there was acute basal meningitis. The pia-arachnoid was much thickened and congested. There was dense polymorphonuclear infiltration. Fibrinous exudate was present in the meninges but with little hæmorrhage. There was no inflammation of the brain substance. Staphylococci were seen in the inflamed meninges. The mucous membrane lining the sphenoidal air sinus showed œdema of its submucous cellular tissue but no evidence of active inflammatory change when stained by hæmatoxylin and eosin. No organisms were seen when stained with Gram's stain.

The coats of the carotid artery in the petrous bone were normal. The lumen was filled with clot, part of which may have been ante-mortem, as seen by the denser peripheral clot. The periarterial lymphatics were seen to be loaded with polymorphonuclear cells when stained by hæmatoxylin and eosin. Gram-positive cocci in groups were seen in the peri-arterial lymphatics and tissues; also a few colonies in the lumen of the vessel, indicating that the dense part of the clot was probably an ante-mortem mural clot.

CASE 2, a railwayman, aged 23, was admitted on July 28th, 1924, complaining of "headache and swelling of the left eye." Two days before, while he was sifting some small stones, a fragment had flown up into the left nostril. He had removed it ten minutes later. On the next day there had been a slight swelling on the left side of the bridge of the nose, and headache in the left orbital region. He was admitted in the evening with swelling of the left side of the nose extending into both eyelids.

On admission the patient looked ill; his temperature was 100·4° and his pulse-rate 72. There was swelling of the lids, conjunctival œdema, and chemosis. The left eye was proptosed and fixed; the tension was increased but the fundus was normal. There was a red tender swelling to the left side of the bridge of the nose, involving the left eyelids and extending across to the right. No abrasion was seen in the vestibule and nothing abnormal could be seen in the anterior nares. There was no tumour or tenderness along the line of the jugular vein, and no enlarged lymph glands were palpable. There was rigidity and tenderness of the posterior muscles of the neck. The reflexes were normal.

An incision from the inner part of the supra-orbital margin, extending downwards beside the nose, was made and the lacrymal bone and frontal process of the superior maxilla were exposed and the anterior ethmoidal cells opened. No pus was found. The middle and posterior ethmoidal cells and then the left sphenoidal cell were opened. The mucous membranes were œdematous but no pus was found. All the tissues were very congested and bled freely. The left middle turbinate was removed and free connexion between the ethmoid cells and nasal cavity made. A drainage-tube was inserted from the anterior nares to the sphenoidal sinus.

The cerebro-spinal fluid was turbid with spontaneous clot. Fehling's solution was not reduced. The blood count showed many polymorphonuclear cells. No organisms were seen in film and no growth obtained on culture. Sensitised streptococcal vaccine (one hundred million) was given. On July 30th the patient became comatose. The temperature was 106°, the pulse-rate 158, and the respiration-rate 34. The patient died at 5 P.M.

Post-mortem Examination.—The diagnosis was abscess of the left ala nasi, bilateral cavernous sinus thrombosis, and basal meningitis.

In the operation area there was an unhealed scar on the left side of the nose which continued back into the ethmoidal region. There was no apparent connection between the operation area and the cranial contents. The left ala nasi was the site of deep-seated pus. The superior ophthalmic veins were thrombosed. There was bilateral thrombosis of the cavernous sinus and circular sinuses, which contained pus. Basal meningitis was present in the region of the cavernous sinuses. The pus contained staphylococci.

Microscopic examination showed acute meningitis; the pia-arachnoid was much thickened, congested, and infiltrated with polymorphonuclear cells. There were areas of hæmorrhage into the meninges. Similar cellular infiltrations were seen around the vessels, spreading along the perivascular sheaths, and in the walls of the veins but not of the arteries. Gram-positive organisms (staphylococci) were present in large numbers in the meninges.

CASE 3, a woman, aged 48, was admitted on March 21st, 1923, complaining of "inability to see clearly out of the left eye." Five days before she had noticed a small red, painful spot at the corner of the mouth on the left side. Next day the swelling and pain had increased and had spread to the left eyelids; there had been epiphora. On the next day the mouth had been painful and there had been shooting pains in the left eye. Two days before admission the pain had become worse, with headache and soreness of the tongue. The day before there had been discharge of yellow material from the corner of the mouth. The patient had vomited on three occasions.

She walked into hospital and, though her vision was noticeably impaired, the mental condition was quite good. Headache was not a prominent symptom. The temperature was 103° and the pulse-rate 110. At 2 P.M. headache was present and becoming severe. On the left side the eyelids were very much swollen, red and shiny. Conjunctival œdema, a slight degree of chemosis, proptosis, and corneal ulceration were present. There was a slight swelling of the lids of the right eye and conjunctival œdema. The pupils were equal in size and reacted normally. The swelling of the left eye was continuous with a swelling on the left of the nose and the main swelling at the left angle of the mouth. This was hot, red, and discharging yellow pus, with a slough visible externally and in the mouth. It was not very painful.

An operation was performed at 5 P.M. and an incision of the septic focus was made at the angle of the mouth; the cavity was scraped and packed. At 12 midnight the patient was roused with difficulty, and was later unconscious. The temperature was 107·4° and the pulse-rate 160. No evidence of meningitis was obtained. She died next day at 2.30 A.M.

Post-mortem Examination.—The diagnosis was carbuncle on the upper lip, bilateral cavernous sinus thrombosis, basal meningitis, and pyæmia.

Conjunctival œdema and hæmorrhages were found in the orbit, worse on the left than on the right. Thrombosis was present in the cavernous sinus and circular sinus, with some suppuration, and the meninges showed acute inflammation over the pons. Infarcts at the base of the right lung were beginning to suppurate. There was early pleurisy over these areas.

Microscopic examination revealed fatty degeneration in the heart muscle cells (osmic stain); one small area of polymorphonuclear-celled infiltration of myocardium was present. A section of the posterior part of the lung through an infarct was made; there was hæmorrhage and polymorphonuclear infiltration, with abscess formation. Acute suppurative meningitis was present round the pons.

CASE 4, a woman, aged 30, was admitted on Nov. 13th, 1923, complaining of "severe headache and swelling of the eye." Fourteen days previously there had been a small abscess on the left side of the nose, which was very painful and swollen, and some headache. The abscess had been treated with fomentations and had discharged and healed, but the headache had persisted. Four days before admission the headache had become worse and there had been throbbing in the back of the neck, in spite of treatment, with a temperature of 100·5°. The day before admission the temperature had been 101·8° and the pulse-rate 85. There was much œdema, proptosis and photophobia of the right eye, and œdema and photophobia of the left eye. Knee-jerks had increased.

On admission at 9 A.M. the patient looked ill; her temperature was 104·5° and her pulse-rate 120. She had a dusky, cyanosed appearance. The eyelids were closed with the œdema, conjunctival œdema was marked, bilateral proptosis was present but no lesion on the nose was visible. The patient died at 4 P.M.

At the *post-mortem examination* proptosis was still marked. The cavernous sinuses and pituitary fossa contained pus which welled up from the cavernous sinus. The pontine area showed early acute meningitis and some meningeal hæmorrhage. The accessory air sinuses were normal.

CASE 5, a woman of 26, was admitted on March 3rd, 1921, complaining of "swelling of the face and pains all over the body." Six days previously there had been a small septic spot at the angle of the mouth on the left side. Four days before she had been "feverish" and had had pains all over, and three days before she had been treated with "serum." She was sent to hospital as acute parotitis.

On admission the patient looked ill; the temperature was 103·4°, the pulse-rate was 118, and the respiration-rate 44. Nothing abnormal was noticed in the eyes except a swelling of the left lids. A very painful, red swelling was present on the left side of the face, extending to the right side. In the chest there was pleural friction at the right base.

At operation a carbuncle was excised, which was found under anæsthesia to be situated deeply in the cheek, with sinuses inside the mouth.

On March 4th the temperature was 104°, the pulse-rate 110, and the respiration-rate 28. Increased swelling of the face, orbital cellulitis and conjunctival œdema were noted. On March 5th the temperature was 104°, the pulse-rate 140, and the respiration-rate 48; proptosis was present. On March 6th at 12.30 A.M. the temperature was 106·4°, the pulse-rate 150, and the respiration-rate 48. The patient died.

CASE 6, a man, aged 20, was admitted on Jan. 28th, 1926, complaining of "severe headache." A week previously there had been a furuncle on the left ala nasi. Four days before there had been swelling on the left side of the nose and the left eye, the temperature had been 101° and the pulse-rate 88. There had been no chemosis or proptosis. Two days before admission the temperature had been 98·2° and the pulse-rate 68. The swelling had diminished and the eye had been normal. The patient had vomited and complained of headache. The day before admission he had again vomited and the headache had still been present. Stiffness of the left side of the face and some œdema of the left lids had been present, but the eyes had been normal. He had been given 10 c.cm. of antistreptococcal serum. There had been severe headache at 10 P.M.

On admission the temperature was 100° and the pulse-rate 90. The patient was very ill and semi-conscious. There was swelling, œdema, redness and pain about the left orbit. Proptosis of the left eye was present and its movements were impaired and the reaction sluggish. There were no signs of meningitis. An incision in the left orbital region for cellulitis was made. There was hæmorrhage and some purulent material from small localised abscesses. The temperature was 104° and the pulse-rate 140. The patient died at seven in the morning on the next day.

Conclusions.

1. Cavernous sinus thrombosis occurs in a small percentage of cases of infection about the nares and upper lip. 2. It occurs owing to the close and free connexion between the angular vein and the cavernous sinus. 3. It occurs as a result of small infective foci in which the tension is high, resulting in a rapid diffusion of the toxins with the invasion of a vein from without. 4. Headache, which increases in spite of treatment to the focus, suggests this serious complication. Chemosis and proptosis are signs which leave no doubt that thrombosis has occurred. 5. Orbital cellulitis is usually associated with the cause of cavernous sinus thrombosis and should be considered in the diagnosis. Sphenoidal and ethmoidal sinusitis may be confused with this condition. 6. A method of treating the septic focus which avoids the dangers of free incision is suggested. 7. The treatment of the infected sinus is palliative, though drainage by one of the routes described may be attempted.

I am indebted to Mr. W. D. Harmer, Mr. F. A. Rose, Mr. L. B. Rawling, Prof. G. E. Gask, and Mr. Harold Wilson for permission to publish these cases.

REFERENCES.

Abercrombie, J.: Diseases of Brain, 1818.
Bircher, H.: Centralbl. für Chir., 1893, xx., 483.
Dighton, C. A. Adair: Ann. Otol., Rhin., and Laryn., 1912, xxi., 411.
Dixon, O. J.: Jour. Amer. Med. Assoc., 1926, lxxxvii., 1008.
Duncan, A.: Edin. Med. and Surg. Jour., 1821, xvii., 333.
Dwight, E. R., and Germain, H. H.: Boston Med. and Surg. Jour., 1902, cxlvi., 456.
Foote, E. M.: Amer. Jour. of Surg., 1929, vi., 438.
Grunert, K.: Leipzig, 1904.
Hinton, J. W.: Ann. Surg., 1927, lxxxv., 104.
Knapp, J. H.: Arch. Ophth., 1868, xiv., 220.
" " : Ibid., 1900, xxix., 429 and 463.
Langworthy, H. G.: Amer. Encycl. of Ophth., 1913, iii., 1794.
Luc, H.: Ann. de mal. de l'oreille, 1905, xxx., 57.
Mainzer, F. S.: Pennsyl. Med. Jour., 1930, xxxiv., 39.
Smith, Dorland: Arch. Ophth., 1918, xlvii., 182.
Speer, G. G.: Med. Jour. and Rec., 1929, cxxix., 9.
Thomson, StClair: Trans. Med. Soc. Lond., 1906, xxix., 22.
Turner, A. Logan: Jour. Laryn. and Otol., 1926, xli., 21
1927, xlii., 31; 1928, xliii., 8.
Vigla, E.: Thèse de Paris, 1839.

SPONTANEOUS TUMOURS IN MICE.

INFLUENCE OF DIET AND AGE.

By Sir Leonard Hill, M.B. Lond., LL.D. F.R.S.,
HON. ADVISER FOR RESEARCH, LONDON LIGHT AND ELECTRICAL CLINIC.

Cancer is rarely seen in a population living a simple and natural life, says F. L. Hoffman, after investigating the incidence among the natives of America from the Arctic to the Falkland Islands. McCarrison and Halliday had each reached this conclusion through prolonged experience of the hill tribes of India. Similar reports have been made of Northern Nigeria and Abyssinia by Dyco Shrap, of the Orange Free State by Fouche, and of West Africa by Tippier. Cancer was formerly never seen among the Basutos by Casalis de Pury, but now, since the introduction of infections such as syphilis, and of alcohol, by civilised people, cancer has become common, and also among the negroes of the United States of America. In British Guiana the negroes are reported to have twice as much cancer as the Indians; the latter are mainly agriculturists, and of simpler habits of life.

The cancer cases reported by Kuhne as seen among Chinese in a hospital in Canton Province were one-tenth as numerous as those seen in the Edinburgh Hospital. In Greenland only nine cases among Esquimaux were recorded in five years (Hindhede). The nomadic races of the Near East no less show a relative immunity to cancer which is ascribed by Fallscheer Zürcher to their simplicity of life. The French Canadians, who are farmers, are reported to have only half the incidence of cancer of the British Canadians (Guest). Havana City shows, says Hoffman, a high cancer mortality-rate, while in the rest of Cuba the rate is relatively low.

Cancer is particularly a disease of old age, and it has been said that natives die too young to develop cancer; also that death certification is so bad that one does not know what they do die of. Against this argument is to be set the fact that the clergy in Britain, who are longest lived, are least subject to cancer. Coalminers, butchers, and publicans, who live less long, have two or three times the cancer-rate of the clergy (occupational mortality figures for 1910–12).

CANCER AND DIET.

It is claimed in popular health papers that a deficiency in the diet of civilised people, of essential substances, such as vitamins, is a cause of cancer. Against this view may be put the fact that the cities of Denmark show the highest cancer mortality in Europe, while the use of sugar and sweets therein is not excessive.

Again, Russians in the cities, who did not eat white bread, had a cancer mortality about equal to that in England. In Holland there is more cancer of the food canal and less of the breast and uterus than in England, while in Italy the cancer mortality-rate is altogether lower.

The Jews, who show a tendency to obesity and diabetes, like the Dutch, have more cancer of the food canal and less of the reproductive organs. In Germany the statistics show the digestive organs among males to be the chief seat of cancer, and next the skin, while among females the reproductive organs head the list, and next the digestive organs and then the skin. An investigation of the vital statistics of a number of houses of Catholic religious orders showed that cancer occurs in a population abstaining from flesh food, and lent no support to the view that among such populations the relative incidence of cancer is low (Greenwood and Copeman).

Hoffman thinks that the irritation of the food canal by eating too much may be a predisposing factor in cancer causation. Young fowls undergoing intensive feeding are said to show a noteworthy percentage of tumours.

Fujimaki observed epithelial proliferation and small papillomata in the gullet, fore-stomach, bladder, &c., of rats fed on a diet deficient in vitamin A. In one case there was found a tumour of the lung, taken to be a metastasis, but the illustration of this shows that it was really one of the spontaneous tumours so commonly found in the lungs of rats and mice. Cramer found such proliferations no less in some old mice fed on ordinary laboratory diets, and Erdmann and others were unable to produce tumours of the stomach by a diet deficient in vitamin A.

McCarrison has contrasted the effects on rats of an ill-chosen diet with a well-selected one. The bad diet led to intestinal and pulmonary disease, and villiform papillomatous outgrowths occurred in the fore-stomach, but no cancer resulted. During several years of experiment both he and Cramer have never found evidence of cancer being caused in animals by ill-chosen diets. Underfeeding may delay the growth of spontaneous tumours, but is disadvantageous to the life of mice in the case of very malignant tumours (Rous).

It has been claimed by Maisin and others that a diet of liver and whole meal enhances the production of tar-cancer, when compared with a diet poor in vitamins, but this appears to be due to the animals living longer on the liver diet. Cramer was unable to confirm this claim.

After a review of the evidence the Imperial Cancer Research Laboratory reported that "there is no reliable evidence, experimental, statistical, or clinical, which would indicate a causal correlation between cancer and the absence, or the presence, or the excess of any particular dietetic constituent. Sensational statements to the contrary are unfounded and ill-considered, and only serve to alarm the public."

ACTION OF IRRITANTS.

Long-continued sources of irritation are known to be causes of occupational cancer—e.g., tar, soot, hot charcoal in the kangri pots used in Kashmir, X rays, mineral oils—all these may produce cancer of the skin, while aniline, naphthylamine, and benzidine may produce cancer of the bladder. Chronic ulcers of the stomach, duodenum, and neck of the uterus not uncommonly result in cancer. Irritation due to chronic constipation is said to be a cause of cancer of the colon. For the induction of carcinoma, says Cheatle, "the irritant must be applied directly to the actual cells, which are eventually the parents of the tumour, and there is a time factor which appears to depend upon the intensity of the application." Thus Fibiger by feeding rats on the larvæ of a nematode (*Spiroptera neoplastica*), isolated from the muscles of cockroaches, induced gastric cancer in over 50 per cent. of these rats. The freed larva burrows superficially in the stomach lining and there develops to maturity, inducing the epithelium to proliferate and become cancerous. The nematode may lodge in the tongue, but not in the gullet or any other part of the alimentary canal.

By injecting tar into the stomach of a rat a squamous-celled epithelioma has been produced in the cardiac portion of that organ of the same type

as that produced by infection with this nematode (Menetrier). Cancer has been produced in the rectum in one out of 16 mice, and in the mouth in one out of 10 mice, by the injection on alternate days of 0·1 c.cm. of 50 per cent. alcohol into one or other orifice (Krebs). It is claimed by Bagg that mammary cancer can be produced in mice by ligating the ducts of the gland.

There is evidence that humoral conditions affect the development of cancer. Thus it is said that tumour tissue, excised and autolysed under suitable conditions, when inoculated makes animals hypersensitive to the growth of transplanted tumour (Chambers and Scott). Cramer excised and minced up the spleen and returned it to the peritoneal cavity in a number of mice. Cancer resulted from tar-painting of the skin much earlier in these than in other mice.

EVIDENCE OF INCREASE OF CANCER.

While statistics drawn from the records of autopsies made in Glasgow Infirmary showed no spectacular increase in cancer in recent years, an increase in cancer of the colon was more evident than of any other site. In the United States of America cancer mortality is reported to be increasing mostly in regard to the food canal, and the foreign-born have a much higher rate than the native-born in this respect; possible factors which appear common to the foreign-born in the United States of America, and to the lowest social class in Britain are a poor diet and bad teeth, alcohol, and syphilis. Sources of chronic irritation have time to act with age, and thus an investigation of almost 1000 autopsies at a French hospital for the aged showed incidence of cancer in 7·7 per cent. (Roussy).

The Bureau of Census, Washington, 1929, showed the relation of age to incidence of cancer per 100,000 as follows:—

Years.	1925.	1926.	Years.	1925.	1926.
Under 5 ..	3·2	3·6	35–44	59·4	59·8
5– 9 ..	1·5	2·2	45–54	165·9	163·0
10–14 ..	1·7	2·1	55–64	382·5	361·2
15–19 ..	3·3	3·6	67–74	743·2	708·9
20–24 ..	5·0	5·3	75 and over..	1070·8	983·6
25–34 ..	15·5	15·8			

Three-quarters of the apparent increase in the cancer mortality of Scotland is attributed to the increasing proportion of older people in the population, and the rest mainly to improved methods of diagnosis.

The expectation of life at birth has been extended by some 17 years, and mostly by saving the children. The mortality-rate between the ages of 20 and 50 has, however, fallen, and when the crude death-rates from cancer are standardised for the change of population at each age group an apparent increase of 25 per cent. drops to one of only 4 per cent., and most of this increase is due, according to Shearer, to better diagnosis and more accurate certification of the cause of death in the aged.

HEREDITY AND CANCER.

The inheritance of a tendency to cancer has been much discussed. In one family a sarcoma occurred in several generations, and in the same situation (Manson), while Warthin, in four families, found evidence of inherited susceptibility to cancer, and Griffith Evans has recorded two families with apparent strong hereditary susceptibility. Werner thinks that the nature of the environment is the potent cause; consanguineous marriages, frequent in certain families, do not, he says, increase any such susceptibility. Most conclusive is the fact that the actuaries of insurance companies find no evidence of inheritance of cancer. In Switzerland the average death-rate for 1911–13 per 10,000 inhabitants aged 40 or over has been, for departments containing a majority of the race *Homo europæus*, 30·63, for departments containing a majority of the Cevenal race, 14·57, and for departments containing a majority of the race *Homo meridionalis*, 13·90 (Pittard).

Strains of mice have, however, been bred which show greatly increased susceptibility to spontaneous cancer, and these strains must have either inherited this susceptibility or been subject to transmission of some cause of infection which results in cancer. Maud Slye has published pedigree charts illustrating inheritance of cancer, but the evidence on which these are based is not very convincing. Lynch has secured 65 per cent. of mammary gland tumours in the first strain of females bred from mice with a high incidence of this tumour. Marsh has bred a strain of mice in which no less than 90 per cent. of the breeding females were subject to mammary carcinoma; the males did not develop this cancer. Dobrovolskara-Nzavadskaia crossed a female mouse affected with mammary cancer with a non-cancerous male and secured a stock of which almost 50 per cent. were affected with cancer. But, says Cramer, in the case of all such stocks, on continued inter-breeding, the high cancer-rate does not appear to continue. Lynch claims that susceptibility to tumour formation produced by tar-painting of the skin may be inherited. Crossing a less susceptible stock with a highly susceptible one, and tar-painting the progeny, increased the incidence of lung tumours greatly.

Borrel believes in infection—e.g., with a nematode—as the cause of spontaneous mouse cancer; a control experiment appears to be required in which females of a low susceptible stock are kept with females of a highly susceptible stock. The experiments given below show a varying, but often high, incidence of tumours, which may be due to infection, although the cause has not been detected.

Experimental Observations.

To study the influence, if any, of age, diet, and bedding materials on the occurrence of spontaneous tumour, a stock of mice were selected at random from the common breeding stock, which had been kept for some years under good conditions at the National Institute for Medical Research. The stock so taken was maintained, bred from, and kept going by Miss M. Brad for six years under the best conditions of cleanliness and care. Mates were chosen at random for breeding, and the males and females not so used were kept apart, for males, if brought up together and not mixed with females, do not fight. The mice in each successive stock were kept till they naturally died, excepting those with obvious tumours. These were killed when the tumour became large. Autopsies were done on all mice, and microscopical preparations made of any tumours. At first Dr. J. M. Murray, and later Dr. J. R. Perdrau, kindly confirmed the nature of the tumours which were found.

Three years in a mouse corresponds to very old age in a man; the process of growing to maturity and of decadence with advancing age can be studied in this period of time.

Stocks of mice were kept on different diets and on different bedding. Some were kept on what approximates to a natural diet for wild mice: (1) barley, oat, and wheat grain, and fresh green food; some on (2) canteen lunch diet, cooked meat, and vegetables with the usual amount of common salt added, and pudding and tinned fruit; some on a (3) canteen tea diet, one poor in vitamins, white bread and margarine,

rock cakes and biscuits, and a little milk; some on (4) a diet found by Dr. A. B. Hill to be the average one of Essex farm labourers, low in protein value; and some on (5) the same diet, a third part of which had been browned by frying, in order to see whether cancer-producing products were produced in food by such burning. Some of the stocks were fasted two days each week, so as to observe the effect, if any, of such abstinence.

The following beddings were tried on mice fed on Diet 1: (1) sawdust and elastin (fine wood shavings); (2) sawdust and cotton-wool; (3) peat and hay; (4) peat and cotton-wool; (5) peat and elastin; (6) sawdust and hay; (7) hay and cotton-wool. The mice on the other diets were kept on cotton-wool and sawdust.

Cancers have occurred indifferently in mice on all diets and on all beddings. The significant influence has been age. In mice dying under 1 year, 2 per cent. of the tumours occurred; in those dying between 1 and 1½ years, 8 per cent.; in those dying between 1½ and 2 years, 40 per cent.; in those dying between 2 and 2½ years, 34 per cent.; and in those dying between 2½ and 3 years, 16 per cent. These figures are striking as the number of mice diminished with age and few lived over 2½ years. The mice fed on the tea diet were healthy, but small in size, could not breed, and in old age were liable to skin troubles, which could be set aside by addition of green food. Tea diet with hay as a bedding produced mice larger in size and able to breed; the seeds in the hay added necessary vitamins. Diet 5, one-third fried, proved less favourable than the diets 1, 2, and 4, on all of which mice grew to be fine healthy animals and bred well. Elastin as a bedding is not so warm as cotton-wool, and mice on this bedding are, in consequence, more active and do not grow so large.

Only one stock, and that a small one, died out just before reaching the age of one year; the loss of this stock was due to pneumonia, a common cause of death among tame mice. The animals were kept in a room at about 60–65° F., and no definite relation was noted between season and weather conditions and deaths from pneumonia. The research began with a stock of 44 males and 44 females, and 35 stocks in all were bred, giving a total of 793 mice, of which 400 were males and 393 females. There spontaneously occurred among these mice 140 tumours of the lung, 76 mammary carcinomas, 29 tumours of the liver, 23 lymphomata, 3 tumours of the thyroid, a few tumours of the ovary, testis, bowel, and some epitheliomata, totalling in all 303. Tumours occurred in 31 per cent. of the males and in 49 per cent. of the females. The higher percentage in females was due to mammary carcinoma. Tumours occurred in those fed on a poor vitamin diet and in those fed on a rich one. They occurred in those on the diet of raw grain and green food even more than in those on a cooked diet. They occurred also in a stock kept on an artificial diet of casein, rice starch, salt mixture, cod-liver oil, and marmite. In the case of the over-cooked diet the number of tumours was large in two stocks, but small in a third, and nil in a fourth one, but these two stocks died out soon after one year was reached. One stock of mice on Diet 1 were fasted throughout life for two days a week, and even for three days a week for one month; the mice made up weight on the non-fasting days, but remained smaller although as sleek, healthy, and long-lived as well-fed stocks. Tumours occurred in this stock during old age no less than among other stocks. The conclusion then was reached that diet had no definitely significant influence on the occurrence of tumours, nor had the character of the bedding any influence, as shown by the Table (Diet 1). The incidence of tumours varies in stocks on the same diet and bedding as shown in Table I. just as much as it varies between stocks on different diets.

TABLE I.—*Diet 1: Raw Grain and Green Food.*

Bedding.	No. of mice.	Males.	Females.	Total tumours.	In males.	In females.	Mammary.	Lung.	Liver.	Lymphoma.
1	26	13	13	7	1	6	4	—	1	1
2	17	2	15	10	3	7	6	—	—	—
3	57	24	33	31	11	20	10	11	1	3
4	34	11	23	16	6	10	8	6	—	1
5	35	17	18	9	4	5	—	3	—	2
6	27	15	12	12	5	7	1	8	—	1
7	15	10	5	3	3	—	—	2	—	—
8	22	12	10	4	1	3	1	3	—	—
9	18	12	6	10	6	4	3	6	1	2
10	13	7	6	3	2	1	—	2	—	—
11	19	7	12	10	4	6	4	4	1	—
12	13	5	8	8	2	6	—	3	—	—
13	18	10	8	8	4	4	2	4	1	1
14	27	19	8	13	8	5	—	11	1	1
15	22	13	9	13	6	7	1	6	4	1
16	9	—	9	5	—	5	4	—	—	—
—	372	177	195	162	66	96	44	69	10	12

Tumours in 43 per cent. of the mice.

Nature of bedding:—(1–5) cotton-wool and sawdust; (6-7) cotton-wool and hay; (8) elastin and peat; (9) hay and peat; (10) cotton-wool and sawdust; (11) elastin and sawdust; (12) cotton-wool and sawdust; (13) cotton-wool and peat; (14–15) elastin and peat; (16) cotton-wool and sawdust.

TABLE II.—*Diet 2: Canteen Lunch.*

No. of mice.	Males.	Females.	Total of tumours.	In males.	In females.	Mammary.	Lung.	Liver.	Lymphoma.
27	14	13	7	1	6	4	1	—	1
17	9	8	3	—	3	2	—	—	—
44	23	21	10	1	9	6	1	—	1

Tumours in 23 per cent. of the mice.

Diet 3: Canteen Tea.

41	24	17	17	8	9	2	7	3	—
13	8	5	4	2	2	2	2	—	—
20	10	10	7	4	3	—	6	2	—
74	42	32	28	14	14	4	15	5	—

Tumours in 37 per cent. of the mice.

Diet 4: Essex Labourers.

27	8	19	7	2	5	3	3	—	1
27	14	13	3	1	2	1	1	2	—
7	2	5	1	—	1	—	—	—	—
14	9	5	8	3	5	3	4	—	1
16	10	6	5	2	3	—	3	1	1
25	11	14	11	4	7	1	8	1	—
25	8	17	8	—	8	—	5	2	—
141	62	79	43	12	31	8	24	6	3

Tumours in 30 per cent. of the mice.

Diet 5: Essex Labourers. One-third Fried.

47	31	16	30	11	19	7	10	3	4
23	11	12	2	—	2	1	1	1	—
42	31	11	21	14	7	—	8	1	1
12	9	3	—	—	—	—	—	—	—
124	82	42	53	25	28	8	19	5	5

Tumours in 42 per cent. of the mice.

Artificial Diet.

13	7	6	4	2	2	1	2	—	—
14	2	12	9	—	9	—	6	2	1
27	9	18	13	2	11	1	8	2	1

Tumours in 48 per cent. of the mice.

Diet 1 and Fasting on Two Days a Week.

11	5	6	7	4	3	—	4	1	1

Tumours in 63 per cent. of the mice.

While the incidence of tumours has been very high no obvious source of irritation has been found. Tapeworm cysts in the liver were occasionally found, but no connexion of these with tumour formation was evident. No nematodes were observed. Tumours of the lung were the most frequent; such tumours claimed to be metastases, or induced by tar, may then, in some cases, be spontaneous.

CONCLUSIONS.

Spontaneous tumours occurred frequently in a stock of mice kept in excellent hygienic condition. The incidence varied considerably in successive stocks which were raised over a period of six years by random in-breeding. The variations in Table I. on the same diet and bedding are large. Different diets, or beddings, had no apparent significant influence on the incidence. Tumours of the lung were common, and may, perhaps, be associated with the liability of mice to pulmonary infection.

Tumours of the Lung.

Tumours of the lung were observed by Harland in 103 out of 275 mice having spontaneous tumours; a very high percentage of all spontaneous tumours observed in mice by Tysser were in the lungs. Many of these tumours are circumscribed, but may grow to a size which destroys life; others are infiltrating and malignant in character. It is recognised that so-called benign tumours—e.g., tar-warts—may become malignant, and it is not just then to exclude the tumours of the lung from the list of spontaneous cancers.

When the lungs of old mice are examined microscopically, localised foci of inflammation are often to be found. With this liability to microbic inflection may go chronic irritation, and the tendency to formation of tumours. Patches of inflammation are not infrequently to be found in the lungs of mice when killed in apparent good health. Overgrowth of epithelium and papillomata of minute size are often to be found in those lungs in which tumours are microscopically evident. Similarly, in the lungs of four human cases of squamous-celled carcinoma of the bronchi, observed by Feyrter, there were found at a number of places, and in bronchioles far removed from the tumour, overgrowths of epithelium and papillary growths of the mucous membrane. In one of these cases an early carcinoma was only detected microscopically.

Feyrter associated the increase of bronchial cancer, which he says occurred after the great influenza epidemic (1918–19), with the inflammatory changes produced by this disease.

In a stock of mice observed by T. Cherry, in which the incidence of spontaneous tumours was 6 per cent., inoculation of small numbers of tubercle bacilli beneath the cuticle raised the incidence to 55 per cent. in males and 71 per cent. in females. Tumours occurred not only in familiar sites in the mice, but in the thyroid, pylorus, colon, pancreas, prostate, and bladder. The tubercle bacilli were taken to be the essential agent in promoting this tumour formation. Lumière claims that carcinoma is a disease of cicatrices; a trauma starts proliferation of cells and some humoral modification comes into play to produce a cancer.

There is a disease of South African sheep called *zagsiekte*, in which proliferation of the alveolar epithelium results as part of an inflammatory process. Cell masses, sometimes papillomatous, grow out from the alveolar wall and fill the cavity. Invasion of the interalveolar tissue also occurs. Some of the epithelial proliferations can be traced to the lining of the bronchioles.

Through irritation by dust cubical alveolar cells become detached and act as phagocytes, such cells may possibly be excited to form a tumour by long-continued chronic irritation.

Schabad tarred the skin of 107 mice for six to eight months and two to three times a week. There survived 96 over three months and 79 over six months. There occurred in 22 a tumour or tumours of the lung, and all these showed either cancer or precancerous lesions of the skin. In those surviving over six months there were lung tumours in 27·8 per cent.

Through frequently painting the skin of mice with tar lung tumours resulted in 66 per cent. of a stock of mice, observed by Murphy and Sturm. R. E. Smith, on the other hand, found tumours of the lungs only in 4 per cent. of mice which were submitted to fumes of tar or to exhaust gases, or painted with gasoline, a figure no greater than that in other stocks of mice which were kept in normal conditions.

Increase of cancer of the lung in man has become evident in mortality returns—e.g., in the United States of America, from 0·6 (1914) to 1·9 (1929) per 100,000, and has been ascribed to the breathing of dust from tarred roads. This increase may be due in part to longer life and better diagnosis—e.g., by X rays. Carcinoma of the lung formed, however, 5·4 per cent. of all carcinomata in Germany 1920–21, and no less than one-seventh of malignant tumours seen during the last five years in the post-mortem room of St. Bartholomew's Hospital were intrathoracic in origin (Maxwell and Nicholson). In the Schneeberg mines in Saxony cancer of the lung has been for years the most significant cause of death, and arsenic in the mine dust has been suggested as a factor.

This research was carried out in the National Institute for Medical Research.

REFERENCES.

Bagg, H. J.: Jour. Cancer Res., 1925, ix., 498.
Chambers, H., and Scott, G. M.: Brit. Jour. Exp. Path., 1926, vii., 33.
Cheatle, G. L.: Brit. Med. Jour., 1928, ii., 1.
Cherry, T.: Med. Jour. Austral., 1929, i., 160
Dobrovolskaia-Zavadskaia, N.: Compt. rend. Soc. de biol., 1930, civ., 927, 1191, and 1193 (abs. in Cancer Rev., 1930, v., 715).
Erdmann, R., Haagen, E., and Börnstein, K.: Deut. med. Woch., 1927, i., 796.
Evans, G.: Brit. Med. Jour., Jan. 24th, 1931, p. 157.
Feyrter, F.: Wien. Klin. Woch., 1927, xl., 648.
Greenwood, M., and Copeman, S. M.: Min. of Health Rep. on Pub. Health and Med. Subjects, No. 36, 1926.
Guest, L. H.: New Health, Nov., 1928.
Harland: Imp. Cancer Res. Fund, Ann. Reps., 1908, 1911.
Hoffman, F. L.: New Health, April, 1927.
Krebs, C.: Zeit. f. Immunitätsforschung, 1928, lix., 203.
Lumière, A.: Le Cancer: Maladie des cicatrices, Paris, 1929.
Lynch, C. J.: Jour. Exp. Med., 1925, xlii., 829.
Maisin, J., and François, A.: Ann. de Méd., 1928, xxiv., 455.
Manson: Observations on Human Heredity, London, 1928.
Marsh, M. C.: Jour. Cancer Res., 1929, xiii., 313.
Maxwell, J., and Nicholson, W. A.: Quart. Jour. Med., 1930, xxiv., 29.
Menetrier: Bull de l'Assoc. pour l'Étude du Cancer, 1924, xiii., 616
Murphy, T. B., and Sturm, E.: Jour. Exp. Med., 1925, xlii., 693.
Pittard, E.: Compt. rend. Soc. phys. et hist. nat. (Geneva), 1926.
Rous, P.: Bull. Johns Hopkins Hosp., 1915, xxvi., 146.
Saiki, T.: Ann. de l'Inst. Pasteur, 1927, xli., 668.
Schabad, L.: Compt. rend. Soc. de biol., 1928, xcix., 1497 and 1550.
Smith, R. E.: Jour. Cancer Res., 1928, xii., 134.
Tyller, E. E.: Jour. Med Res., 1907–08, xvii., 155; 1909, xxi., 479.
Warthin, A. S.: Arch. internat. Med., 1913, xii., 546

PAY BEDS FOR MIDDLE-CLASS CHILDREN.—The Cheyne Hospital for Children, at Chelsea, has provided a small private ward for children suffering from affections which require prolonged treatment, which is said to be the only one in a London hospital of this type. The weekly charge varies from £3 3s. to £5 5s., and the fee payable to the physician or surgeon is subject to confirmation by the hospital authorities. The ward has a southern aspect and overlooks the Thames and the Chelsea Embankment.

UNUSUAL COMPLICATIONS OF DIPHTHERIA.

By E. Noble Chamberlain, M.D., M.Sc. Liverp., M.R.C.P. Lond.,

SENIOR HON. ASSISTANT PHYSICIAN, ROYAL SOUTHERN HOSPITAL, LIVERPOOL;

AND

Stanley Alstead, M.B. Liverp.,

ASSISTANT MEDICAL OFFICER, CITY HOSPITAL FOR INFECTIOUS DISEASES, LITTLE BROMWICH, BIRMINGHAM.

PERMANENT HEART-BLOCK.

Complete heart-block during diphtheria does not seem to be an uncommon complication when the myocardium is severely affected. A detailed description of the clinical findings in diphtheritic heart-block has been given by Korach [1] who described two fatal cases. In recent years numerous references to the subject have appeared and many electrocardiographic records have been published. Thus Stecher [2] has reported 19 cases of complete auriculoventricular dissociation. Two cases with notes on the post-mortem findings have been described by Marvin and Buckley.[3] Allen [4] has also published a case but without electrocardiographic tracings. All these cases appear to have terminated fatally, and this result is in agreement with the experience of Harding.[5]

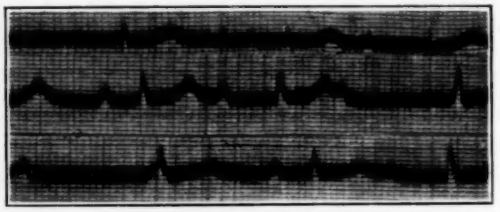
Transitory heart-block, partial or complete, has been noted by many observers, but few of the cases in which heart-block has been complete have recovered, death having occurred from circulatory failure or some other cause such as diaphragmatic paralysis. Ducamp and Janbon,[6] however, have described a single case characterised by complete heart-block in which recovery did take place and the normal rhythm was re-established.

Only very occasionally, it seems, does evidence of a damaged myocardium persist after diphtheria. Parkinson [7] has published the "first undoubted case" of heart-block in diphtheria which later gave place to auricular fibrillation, the latter condition being present on re-examination of the patient after six months. In an interesting article by Reid,[8] details of a case of permanent bradycardia are given and reference is made to a case of complete heart-block following diphtheria, described by Read.[9] Butler and Levine [10] have recently emphasised the importance of diphtheria as an ætiological factor in the production of late heart-block. The comparative rarity of heart-block as a permanent condition following diphtheria justifies the publication of the following case:—

Case 1.—A woman, aged 28, had been admitted 18 years previously to the Birkenhead Infectious Diseases Hospital suffering from diphtheria. She had had no previous illnesses. The diagnosis of diphtheria was confirmed by repeated bacteriological examinations. Peripheral neuritis affecting the hands and feet occurred as a complication in the course of the disease. The patient states that antitoxic serum was given but no details of the treatment are now available. She was discharged from hospital after six weeks. Recovery from the effects of peripheral neuritis was complete in about nine months, but during the first few weeks of convalescence the patient had several "heart attacks" characterised by præcordial pain and dyspnœa. These symptoms disappeared and have not recurred. Her present condition is very satisfactory; she looks well and states that she enjoys perfect health. On moderate exertion however, she is conscious of her heart "bumping" though no irregularity is noticed, and she becomes "crimson in the face." There is no history of fainting attacks or fits. For many years the patient has ridden a bicycle nearly every day without any ill-effects.

The apex-beat of the heart is in the fifth intercostal space, three and a half inches to the left of the midline. The rhythm is quite regular and the rate about 46 beats per minute. The cardiac thrust is easily palpable but there are no thrills. The mitral and aortic second sounds are apparently slightly accentuated, otherwise all the heart sounds are normal. There is a soft systolic bruit at the mitral area conducted about two inches towards the left axilla and there is a short aortic systolic murmur which is not conducted. There are no signs of cardiac failure. The arteries are barely palpable at the wrist and the blood pressure is 124/64. The urine is normal, the tonsils quite healthy, and the Wassermann reaction negative. Electrocardiograms (see Figure) show complete heart-block.

The interest of this case lies principally in the permanent defect of conductivity following diphtheria. Most diphtheritic affections of the heart are essentially of an acute nature, disappearing within a year of the illness, but the present case is an example of a small but definite group of cases in which the heart is permanently damaged by diphtheria. It is also instructive to note that in spite of a permanent and complete heart-block existent for many years no Stokes-Adams seizures have occurred and no subjective or objective signs of heart failure.



Electrocardiogram, showing complete heart-block.

DIPHTHERITIC HEMIPLEGIA.

The subject of diphtheritic hemiplegia has recently been reviewed by J. D. Rolleston,[11] who points out that since the condition was first described by Sir William Gull in 1859 barely a hundred cases have been recorded. Cases which have come to autopsy show that the lesion is vascular in origin and due to embolism, thrombosis, or hæmorrhagic encephalitis. It appears that embolism is the commonest cause and is attributed to an apical endocarditis (Marfan [12]). Diphtheritic endocarditis affecting the mitral valve and causing mitral incompetence is unusual, especially when associated, as in the case mentioned below, with hemiplegia which developed during the acute stage of the condition.

Case 2.—The patient, a girl aged 18, had diphtheria when 7 years of age. The only illnesses she had had previously were chicken-pox and whooping-cough, otherwise she had been healthy in every way. The disease affected the fauces and the diagnosis of diphtheria was confirmed by bacteriological examination. Hemiplegia developed while the patient was very ill during the third week of the illness. At first it was a flaccid paralysis affecting the face, arm, and leg on the right side, but later spasticity developed in both limbs. The doctor who attended the case recalls that the heart was severely affected during the illness and the prognosis was considered to be very poor. Seven weeks after the onset of diphtheria the patient was admitted to an isolation hospital suffering from scarlet fever, and at the beginning of this illness it was noted that the child's heart was already damaged. Recovery from scarlet fever was rapid and uneventful.

Until 12 months ago she had no cardiac symptoms. Lately, however, she has complained of shortness of breath on exertion associated with præcordial pain, stabbing in nature, lasting for a few minutes and completely relieved by rest. The paralytic condition has persisted since the onset, and though there has been a gradual improvement there are signs of early contracture.

The right arm and leg are spastic and wasted and have exaggerated tendon reflexes. The plantar reflex is extensor in type on the right side and flexor on the left side. There are brisk abdominal reflexes on the left side but those on the right are diminished and sluggish. There is a slight right-

sided facial paresis. The pupils are equal and react normally. On the left side there is a slight internal strabismus. The organic reflexes are normal, though there has been dysuria for the past four years which appears to be functional in type and not connected with the illness. There are no sensory changes.

The apex-beat of the heart is in the fourth space and four inches to the left side of the midline. The cardiac thrust is tumultuous on palpation. The first mitral sound and the aortic second sound are both accentuated, especially the former. There are numerous extrasystoles. These have diminished with rest in bed. The radial artery is not palpable and the blood pressure is 140/100. The tonsils are healthy. The urine contains a trace of albumin but microscopically there is only squamous epithelium present. The non-protein-nitrogen is 35 mg. per cent., and the urea concentration and dye excretion tests are normal. The Wassermann reaction is negative. The electrocardiogram shows biphasic T waves in lead III., but is otherwise normal.

SUMMARY.

Two cases of unusual complications following diphtheria are recorded: (1) A case of complete heart-block persisting 18 years after the diphtheritic infection, and causing practically no symptoms. (2) A case of spastic hemiplegia following diphtheria and associated with mitral regurgitation. It is surmised that both the hemiplegia and the mitral regurgitation are due to an endocarditis occurring during the course of the diphtheria 11 years previously.

We are indebted to Dr. Eric Murphy (Birkenhead) and to Dr. de Boinville (Liverpool) for permission to publish Cases 1 and 2 respectively.

REFERENCES.

1. Korach, S.: Med. Klin., 1929, xxv., 427.
2. Stecher, R. M.: Amer. Heart Jour., 1928–29, iv., 545.
3. Marvin, H. M., and Buckley, R. C.: Heart, 1923–24, xi., 309.
4. Allen, R. C., and Barber, H.: Brit. Med. Jour., 1921, i., 267.
5. Harding, M. E.: Ibid., p. 321.
6. Ducamp, M. G., and Janbon, A.: Bull. Soc. Sci. méd. et biol. de Montpellier, 1924–25, vi., 33.
7. Parkinson, J.: Heart, 1915, vi., 13.
8. Reid, W. D.: Amer. Heart Jour., 1930, v., 524.
9. Read, J. M.: Jour. Amer. Med. Assoc., 1929, xciii., 1125.
10. Butler, S., and Levine, S. A.: Amer. Heart Jour., 1930, v., 592.
11. Rolleston, J. D.: Acute Infectious Diseases, London, second edition, p. 31.
12. Marfan, A. B.: Leçons sur la diphtérie, Paris, 1905.

THORACOSCOPIC TECHNIQUE

INFLUENCED BY TYPE AND POSITION OF ADHESIONS.

By F. G. Chandler, M.D. Camb., F.R.C.P. Lond.,

ASSISTANT PHYSICIAN TO ST. BARTHOLOMEW'S HOSPITAL; PHYSICIAN TO THE CITY OF LONDON HOSPITAL FOR DISEASES OF THE HEART AND LUNGS, VICTORIA PARK.

In a previous communication[1] the advantages of a single instrument for thoracoscopy and adhesion cutting, and the advantages of the diathermy current have been described. It is not to be thought, however, that it was claimed that these methods were necessarily the best in all cases. It is not entirely a question of one instrument or two instruments, of diathermy or the electrocautery, but what type of case is best suited to one, and what to the other. G. Maurer,[2] of Davos, for example, uses two instruments, and makes use of both the diathermy current for coagulating and the electrocautery for cutting, and his technique and his results are excellent.

There is little doubt, however, that the use of one instrument only is, in many cases, more easy and in a large number of cases very satisfactory. If it is found that the instrument has been inserted in a spot which makes access to the insertion of the adhesion awkward, even after careful localisation, as previously described, another diathermy electrode can easily be inserted through another cannula in another place, if this seems simpler than reinserting the operating thoracoscope. The 30° telescope would then serve as the source of illumination. The electrode can be a separate one, or the operating thoracoscope may be used as a simple electrode.

There is, however, one type of adhesion which is not well suited to the diathermy cutting wire, and that is the string adhesion. It offers great resistance. Even though it be cut well away from the parietal wall (which it is safe to do as it cannot contain lung), pain or the jumping phenomenon is experienced owing to the heat or an electric stimulus being conducted to the parietal insertion of the adhesion. The base, therefore, must be anæsthetised. Sometimes there are numbers of these adhesions. Each must be anæsthetised. This takes time. Each prick is felt. Oozing may occur from each prick; and when all is done the adhesion may be very difficult to cut owing to its resistance. All this can be avoided by using an electrocautery. If it is used a short distance from the pleura, no pain is felt. There is no danger from bleeding in this type of adhesion. The adhesion is severed in a few moments. For this reason I have had made a minute electrocautery which can be passed through the cannula, alongside the needle telescope, or rather in the groove between the flexibile shaft carrying the light and the telescope. A cable connects this to a small transformer which hangs on to the operating table and provides both the light current and the cautery current. The cautery can be pushed in and out and used at any desired distance from the end of the telescope. Thus a distant or close-up view can be obtained at will, and the best distance for working be secured. It is very easy to manipulate and has necessitated no modification nor further complication of the instrument. Cord adhesions can also be severed by this method the danger of bleeding being minimised, in the usual way, by keeping the cautery at a dull red glow. With large, broad, thick adhesions there are difficulties from smoke, smell, and bleeding if the electrocautery is used; these should be eliminated by the use of the diathermy current.

To summarise: for string adhesions, division by electrocautery appears to be the best method; for large adhesions, diathermy. Whether to use one instrument or two—that is to say, whether to do everything through one cannula, involving one puncture only, or through two cannulas—seems to depend on visibility and ease of access to the parietal insertion of the adhesion. Other things being equal I believe the one instrument method to have a number of great advantages. If the work can be done quite well through one puncture, why make two?

[1] THE LANCET, 1930, ii., 74.
[2] Ibid., p. 72.

PROPOSED TUBERCULOSIS HOSPITAL FOR EAST GLAMORGANSHIRE.—Dr. T. W. Wade, of the Welsh Board of Health, recently held an inquiry at Cardiff into the proposal of the Welsh National Memorial Association for the erection of a new tuberculosis hospital at Hayes Farm, Sully. The medical committee of the Association recommended that two hospitals should be provided, one for Swansea and the western side of Glamorgan, and the other to meet the urgent demands of Cardiff, East Glamorgan, and the adjoining area. It is calculated that the capital expenditure on the hospital during the next two years would be £125,000, exclusive of expenditure on land. The number of beds it is proposed to provide is 250 with future extensions to 300 or 350. The inspector will make a report to the Ministry of Health.

CLINICAL AND LABORATORY NOTES

THIRTY-EIGHT YEARS WITH A FRACTURED SPINE.

By Douglas Green, M.B. Lond., F.R.C.S. Eng.

The unusual length of the period of survival after sustaining a fracture of the spine seems of sufficient interest to warrant publication. Perhaps some of your readers can answer my contention that the case is unique. During my student days it was generally taught that the maximum expectation of life after such an injury was two years, while the average was much shorter. Only recently I treated another man who lived over 12 years, after being thrown from his horse and sustaining a fracture of the spine through the twelfth dorsal vertebra.

The present case was somewhat similar. On August 8th, 1892, a telephone linesman, then aged 21, fell from a high telephone pole and fractured his spine between the eleventh and twelfth dorsal vertebræ, After a stay in hospital he was sent home and was attended by my predecessors in this practice. On my first making his acquaintance he was living in a spinal carriage with complete paralysis of both legs and lower abdominal muscles. Contraction of the muscles had taken place with the result that the legs were stiff, the hips being in normal position to the body in the supine position, the knees extended, and the ankles and feet in extreme talipes equino-varus with large corns over the external malleoli from friction of the bedclothes. Nursing was carried on by his sister, some eight or nine years older than himself, and no bed-sores appeared in the whole period he was under my observation. Naturally he had incontinence of urine and fæces and suffered from cystitis. He washed out his bladder daily with a weak solution of Condy's fluid, using an ingenious syphon arrangement attached to an ordinary rubber catheter.

Twelve months ago a perinephritic abscess appeared in the right loin. This was incised without the necessity of an anæsthetic and has since discharged urine and pus through a small sinus, urine also draining per urethram. Death finally ensued on March 9th, 1931, through renal insufficiency due to pyelonephritis secondary to cystitis, the man then having just reached his sixtieth birthday.

Sheffield.

RECURRING HERPES GENITALIS IN THE MALE.

ÆTIOLOGY AND TREATMENT.

By J. Avit-Scott, M.D. Birm.,

HONORARY DERMATOLOGIST, MIDLAND HOSPITAL, BIRMINGHAM.

Recurring herpes genitalis in the male is one of those minor ailments which besides being a great nuisance to its unfortunate owner, opens the door to much more serious infections like syphilis and soft chancre. The diagnosis is quite easy, and the disease so common that no full description is needed. When seen early the lesions, which are generally found in the balano-preputial groove, appear as a cluster of small rounded vesicles, the size of a pin's head and containing a clear fluid. Later they appear as a cluster of shallow circular erosions which are not indurated if they have not been irritated by caustics or other forms of unsuitable local treatment. The lesions are rather irritating and slow to heal considering their small size, but the irritation is as a rule most intense for a day or two before the vesicles appear. The consensus of opinion is that the condition is due to a filter-passing virus, and its frequent association with chronic venereal conditions of the genital tract, which had been noted by Doyon and Diday, suggested to me a method of treatment, and after effecting a cure in 12 cases I am of the opinion that in the majority of cases the condition is due to the presence of septic foci in the prostate.

I had noted during the war in France that prostatic massage in cases of chronic prostatitis often brought about an attack of herpes genitalis in patients, whether they had previously suffered from the condition or not, and I noted also that the cure or improvement of the prostatic condition led to an apparent disappearance of the herpes. Herpes genitalis often follows extra-conjugal intercourse or excessive coitus, which may be the equivalent of a powerful prostatic massage and shake up the infected foci. I do not know if excessive coitus or massage of the prostate releases a filter-passing virus which acts on the nerve-endings in the balano-preputial groove, but the following line of treatment has proved successful in these cases.

In all cases of recurring herpes genitalis, whether they suffer from a gleety discharge in the morning or whether they have threads in the urine or not, my procedure is as follows:—

(1) The possibility of stricture is settled by passing Nos. 7, 8, 9, 10, 11, 12 gum elastic bougies; if there is a stricture it may take several weeks to reach No. 12, and during this period hexamine. grs. 10 with tr. hyoscyamus ℥xx. three times a day before meals, is given in a small tumblerful of water.

(2) When a free flow of urine has been established the prostatic massage is commenced, which must be gentle at all times, but especially at first when the prostate may be acutely tender. The patient is instructed to hold his water for two hours before coming to me, when he is asked to pass a few ounces of urine in a conical glass, and the state of affairs in a case of threads or gleet is noted—then massage is performed gently on a bladder still partly full, after which the patient is instructed to empty his bladder completely.

(3) After the third prostatic massage which is repeated at intervals of a week, I begin instillations with weak solutions of silver nitrate. The patient after massage empties his bladder and by means of a small flexible acorn catheter size about 7 or 8 (French) fitted on the nozzle of a 1 c.cm. hypodermic syringe and the whole apparatus filled with the solution, a few drops of the silver solution in instilled in the prostatic urethra and also along the anterior portion of the canal. It is generally quite safe to start with a 1 in 3000 solution of silver nitrate. If the patient does not experience any undue desire to micturate after this and is able to hold his water for two hours or so, the next time I generally use a solution of 1 in 2500 and so on up to 1 in 500 if necessary, but 1 in 1000 which may be repeated several times is generally the maximum strength required. This is the treatment of prostatic gleet, and a very successful one too, if it is remembered that

no force is required in massaging the prostate and that instillations with strong solutions of silver nitrate do more harm than good.

After three or four weeks of treatment by massage followed by instillations one finds that the prostate, instead of being tender all over, is only tender over certain areas and then I massage gently over those spots which the patient indicates to me. The local treatment of recurring herpes genitalis consists in not irritating the lesions; the parts should be cleaned with warm water, dried carefully, and dusted freely with pure talcum powder. During the treatment of two cases I had curious experiences. One patient developed a typical eruption of herpes zoster affecting the left buttock and left thigh down to the knee, and as this form of herpes is considered to be of a different nature than the one we are now considering, the occurrence was probably a curious coincidence. The second patient was relieved from a mild but generalised pruritus of over 12 months' standing which I intended to deal with at a later date.

As a dermatologist I attach more importance to a prostate which feels what may be called normal, and is free from pain and lumps on massage, and to the absence of heavy sinking threads in the urine than to the presence of a few pus cells and a few fine floating threads in the urine, which may be due to a superficial catarrhal inflammation of the mucous membrane, as a rule clearing up completely in a month or two in the absence of over-treatment.

MEDICAL SOCIETIES

OPHTHALMOLOGICAL SOCIETY.

ANNUAL CONGRESS.

THE annual congress of the Ophthalmological Society of the United Kingdom took place at University College, London, from April 23rd to 25th, under the presidency of Mr. LESLIE PATON. Among numerous papers contributed was one on

Non-luetic Argyll Robertson Pupil

by Mr. R. FOSTER MOORE. It recorded eight additional cases since his paper on the subject in 1924. Twelve of the total 15 cases were in females, so the condition could be said to be commoner in the female than in the male sex. He could not be definite about age incidence, since a number of the cases were discovered quite by accident, some had not been known to the patient, and in none was the date of onset accurately known. Some might be congenital, though in only one case was it suggested that the condition had been present ever since birth. The ages of onset given ranged from birth to 42. In 14 cases the fundi were examined with the aid of a mydriatic, but in none was any important abnormality discovered. The visual acuity did not seem to be affected; in 14 cases it was 6/6 in each eye after correction. The condition was usually unilateral and the pupil might be described as semi-dilated. It was practically inactive to the light stimulus, whether direct or consensual. Contraction occurred with convergence, but the rate of such contraction varied much, as also did its completeness. There was always a slow relaxation. Accommodation was not paralysed, and Mr. Foster Moore did not think the ciliary muscle was involved. It was important, he said, to discover whether these pupils bore any relation to syphilis in the patient, or whether any general nervous disorder coexisted. In none of this series was there a history of syphilis, or discovered syphilitic lesion. In two cases there was a slight drooping of the upper lid.

Leber's Optic Atrophy.

Dr. RITCHIE RUSSELL (Edinburgh) read a paper on Hereditary Aspects of Leber's Optic Atrophy. This disease, he said, did not seem uniformly to follow the rules of inheritance of a single recessive character. In Leber's disease an affected male rarely had affected grandsons. The mode of inheritance was not the same in the various sex-linked diseases, and in some strains at least an accessory factor was concerned in their development. Dr. Russell's paper dealt with four cases in the same generation in a family living in the Orkneys.

The first patient, a man aged 40, had loss of vision and pains in the legs. At first there was only slight dimness of vision after reading; it did not interfere with his work as a carpenter. Later he had severe pains in the right eye, which lasted a week, and with these pains the vision failed rapidly in both eyes. Coincidently he had pains in both feet, and they became swollen. Vision had improved but little. He had five healthy children. Higher cerebral functions were apparently undisturbed. Both the discs were blue-grey in colour; the edges were sharply outlined, and the lamina cribrosa was prominent. No changes were apparent in the maculæ or the periphery of the retinæ. The pupils were 4 mm. in diameter, circular, equal, and regular in outline. Ocular movements were full in all directions. Neither nystagmus nor diplopia was present, but the patient could not converge. No disturbance of muscle power, tone, or coördination was noted; neither was there any abnormality to light touches, to pain, or appreciation of passive movement.

The other cases were somewhat similar, with variations. Three cases in the generation followed a consanguineous mating; probably the original stock bore a trait of the malady. Perhaps a second factor, not sex-linked, and multiplied by the consanguinity, was concerned in the manifestation of the disease. Dr. Russell did not think this likely, but the consanguinity might have reduced the general vigour of the stock and so caused a dormant trait to become manifest again. Leber's disease showed no evidence of its presence until years after birth, and in this it stood alone in this group of diseases. It could be classed as an instance of inherited tissue vulnerability.

Mr. A. W. ORMOND read notes on

Ocular Symptoms in Osteitis Deformans.

The case he described was reported by Dr. Herbert French in 1920, and eight years later Mr. Ormond saw him because of his ocular condition.

The first complaint had been of pains in the right tibia, followed by pain and aching in all bones. A curvature of the radius was noted, and at a later stage there was pain in the head bones. He had not had typhoid fever, nor lived abroad, there was no history of syphilis, and he was an abstainer and non-smoker. Early in the illness he complained of a flickering to the right in his eyes, and he tended to move to the right instead of straight ahead. Vision in the left eye was defective; and he could not see with it unless he looked towards the ground. When Mr. Ormond saw him there were definite pathological changes in the fundus of the left eye involving the macular area. Vision of the right eye at that time was 6/6, but that of the left was less than 6/60, and there was only peripheral vision. A large choroidal hæmorrhage was seen, with much disturbance of retinal pigment. Later there was much failure of vision in the right eye, and similar changes to those in the left, the visual acuity being no more than 6/36.

This year the patient could not see 6/60 with either eye, and central vision was very depressed. In the right eye

was a large mass of organising tissue in the macular area. There was also, in this neighbourhood, a scattered patch of probably old hæmorrhagic pigment. The left macular region was occupied by an atrophic area, with sclerosed and tortuous choroidal vessels; the arteries were small and attenuated. There were gross changes surrounding the optic disc. The hearing power was lessening.

It was clear, Mr. Ormond said, that the ocular defects which had been reported in association with Paget's disease were due to two separate conditions: (1) changes caused by the optic foramen pressing on the nerve and leading to changes in the fields of vision, with loss of visual acuity and the production of optic atrophy, &c.; (2) definite retinal and choroidal disturbance with hæmorrhages the result of widespread vascular changes which did not affect the nerve head at all. Many observers had found in the eyes of patients suffering from osteitis deformans a condition similar to that found in advanced disease consequent on inherited syphilis. Tubby had stated that the disease was probably a disorder of the perverted metabolic type. In one recorded case marked improvement followed a change from a partially carbohydrate to an almost exclusively protein diet. With the diagnostic aid of improved radiography the disease did not appear to be as rare as was formerly supposed.

The general weight of opinion seemed to be that a toxin or some chemical deficiency, acting through the blood stream and affecting the vascular system generally, was at the root of the matter. Most cases of long standing had some evidence of vascular changes, both in the fundus oculi and in the body generally.

Treatment of Detached Retina.

Mr. C. SHAPLAND contributed a paper on A Hundred Cases of Retinal Detachment Treated by Cautery Puncture. He said that in December, 1929, Sir William Lister carried out the first operation in Moorfields Eye Hospital according to Gonin's method for retinal detachment, and since then 100 cases had been so treated. This operation presupposed that a hole in the retina had been discovered, and an effort was made to occlude it by a cautery puncture. Fifty-six of the patients were males, 44 females, and the average age was 41½ years. Refractively considered, there were four groups: high myopes, low myopes, aphakics, and emmetropes. Thirty-two patients had a myopia of more than 5 D, 24 less than this, three had aphakic eyes, and in 41 the refraction was either emmetropic or slightly hypermetropic. Trauma (local or general) seemed to have been an ætiological factor in a small proportion of the myopic detachments, and a much larger proportion in the emmetropic group. In the 56 cases of myopic detachment, nine had a blow on the affected eye or adjacent part of the head immediately before the visual defect occurred. In a case of bronchitis the coughing seemed to have precipitated the detachment. In the emmetropic cases 16 gave a history of recent local injury.

Retinal holes could be put into five groups. The commonest site for a retinal hole was the periphery of the temporal half of the globe. Disinsertions showed a marked preference for the emmetropes; 66 per cent. of the rents were at the ora serrata, while they occurred in 25 per cent. of the low myopes, and only 9 per cent. of the high myopes.

Forty of the 100 cases were discharged from the hospital cured, and 17 others showed improvement, either in visual acuity or the area of the field. The average age of the cases cured—both sexes—was 34½. The average duration of the detachment, from the time of onset of the visual symptoms in the affected eye to the date of admission to hospital for operation, was seven weeks, the longest duration after which a successful result was attained being 12 months, and the shortest, seven days. In the aphakic group no successful result was obtained. The round-hole cases afforded the best prognosis, 53 per cent. of these being cured; disinsertion cases gave 49 per cent. of cures. Of the 40 primarily successful cases, recurrence of the detachment took place in 11, the interval varying between a week and eight months. In 30 of the total cases the restoration had remained in situ—for 15 months in the earlier cases.

Vitreous hæmorrhage at the seventh to tenth day after operation was the worst sequel when the Paquelin cautery was used, but after this was supplanted by the electric thermo-cautery this complication had been practically absent. There were four cases of fairly severe uveitis, two of traumatic cataract, and two of subretinal hæmorrhage. No eye in the series was lost through panophthalmitis.

The PRESIDENT spoke of the importance of this treatment for what had formerly been looked upon as a very hopeless condition, so that ophthalmic surgeons were taking up this line of attack with great hopes of success. Yet in early days successes could be recorded. In 1906 he operated upon a lady for a detachment which caused blindness in the eye, and the last time he saw her, 24 years later, she was seeking a licence to drive a motor-car. Another patient, whose vision had been reduced to mere perception of hand movements, shot, some time after the operation, 22 partridges and a rabbit with 24 cartridges.

Mr. FRANK JULER mentioned a series of his own cases of detachment which he had treated by the Gonin procedure. He had had 32 per cent. of cures. One case was that of a man aged 50, whose vision before the operation was reduced to hand movements on the temporal side. After the Paquelin cautery applications both the field and the vision were improved at once. The retina was in place up and in, but was still detached below. Another small hole was detected in this area, and eight and a half months after operation the retina was in place throughout, and the visual field was full. The other case was one of bilateral detachment of old standing, in a man aged 27. Operation resulted in a vision of 6/24 in the right eye, 6/5 in the left, the fields were full, and the retinæ firmly fixed.

Chronic Blepharitis.

Mr. M. S. MAYOU submitted a contribution on Treatment of Chronic Blepharitis with Vaccine. The condition, he said, varied in severity from the seborrhœic type—in which a small amount of discharge stuck to the lids, with a slight desquamation of the epithelial cells at the lid margin—to severe ulcerative blepharitis with destruction of the lid margin, hair follicles, glands, &c., and thickening due to the chronic inflammation of the lid. The milder forms were easily remedied by using the customary staphylococcal vaccine and the local application of lotions and ointments such as yellow oxide of mercury and resorcin. His purpose was to speak of the treatment of the more chronic type, which gave rise to trichiasis and tylosis, with eversion of the puncta and ectropion. Infection of the conjunctiva was always present. In the first instance the infection was staphylococcal, derived from the glandular secretions of the lid margin, but, sooner or later, there was usually an infection with the Morax-Axenfeld bacillus. Usually there was an accompanying eczema of face and head. It was important at the beginning to get rid of any

source of septic infection, such as tonsils, or to deal with discharging ears, and to give appropriate tonic treatment, with sunlight, cod-liver oil, and, if necessary, glasses. Considerably improved results ensued at the Swanley institution by injecting a mixed vaccine of staphylococcus and Morax-Axenfeld bacillus into the eyelid. It was of the strength of 500 million to 1 c.cm. of each organism. If cases did not respond to this, they did to an autogenous vaccine. The treatment was continued once a fortnight until a cure ensued. When patches of ezcema were associated with chronic blepharitis, injection of vaccine under the patches had often cleared up those areas, even when they had existed for years and had not yielded to any other form of treatment.

One session was set apart for a discussion on

Affections of the Eye Due to Viruses.

Dr. J. R. PERDRAU, in opening, said that the terms ultramicroscopic and filtrable were not applicable to viruses as known to-day. So long as the agent responsible for a disease remained undiscovered, it could not be spoken of as the virus of that disease. He entered into a consideration of the better known characters of viruses, and a comparison of them with visible bacteria. The mere fact that the causative agent of any particular disease passed through one of the filter candles in common use did not justify its inclusion among the viruses, at least until the conditions of filtration had been standardised. Certain virus diseases were characterised by the presence of inclusion bodies in one or more organs or tissues. Some, such as the Negri bodies of rabies, were highly characteristic, and important for diagnostic purposes. Inclusion bodies had been produced in the rabbit's cornea by physical agents, such as ultra-violet rays. An important negative character of viruses was that, up till now, it had been impossible to cultivate them on lifeless media. There was often a close association between viruses and the cells of the tissue or organ in which they multiplied in the living animal. This had proved to be a very important factor in the experimental study of viruses, particularly in regard to problems of infection and immunity in their broadest sense. Dr. Perdrau proceeded to speak in detail of the study which had been made in regard to the viruses of vaccinia and herpes; also on species specificity and tissue specificity in relation to immunity.

Mr. F. T. RIDLEY devoted his attention to some diseases of the eye which were known to be due to viruses, with some reference to the viruses which attacked the eyes of animals. The virus of vaccinia inoculated on the cornea of a rabbit caused a lesion similar to the vaccinial pustule on the skin. Hypopyon was frequently seen. The acute condition subsided, leaving opacity of the substantia propria and permanent scarring. There was a generalised immunity to reinfection with the virus of vaccinia. In herpes febrilis keratitis the lesion started as a localised opacity in the substantia propria. This might so spread as to involve the whole cornea. Perdrau's virus, obtained from lungs of patients dying of pneumonia, produced very severe keratitis, usually involving the whole cornea. It was accompanied by great vascularisation. Mr. Ridley spoke also of dendritic ulcer, which, he said, might arise in several ways. In many cases it arose in association with malaria, and in these it was relieved by administering quinine.

Mr. F. A. WILLIAMSON-NOBLE thought that in the case of the herpes virus infection a very important factor was the resistance of the patient or the local resistance of the part affected. As to the pathology of herpes zoster, Head and Campbell's description in 1900 still held good. The virus caused an acute inflammation in the Gasserian ganglion, and this was accompanied by hæmorrhage, the eventual condition being a fibrosis, with thickening of the overlying sheath. In severe cases the virus spread so as to implicate other nerves. Treatment was mainly symptomatic, but Friedenwald had reported the result of treating such a case with convalescent serum. Coincident iritis proved to be resistant, but eventually the vision rose to 6/9. Speaking of sympathetic ophthalmia, which Mr. Williamson-Noble thought might be due to virus infection, he said that Sommer had described two cases of sympathetic ophthalmia following herpes zoster, though in both those patients there was perforation of the globe. Both eyes showed the histological changes of sympathetic ophthalmia. Szily had stated that the clinical picture produced by the herpes virus suggested that sympathetic ophthalmitis might be caused by a virus, so far undiscovered, which passed from one eye to the other by means of the sheaths and chiasma of the optic nerve. If this were true it was important when considering the question of removal of the exciting eye; the optic nerve should obviously be severed, and as far back as possible.

Dr. L. H. SAVIN spoke of two cases in which he thought a virus was responsible for the activation of other organisms. One was a case of cavernous sinus thrombosis which followed nine days after injection of a vaccine for rheumatism. The patient had swollen eyes and face and a temperature of 105° F.; a blood-stained fold of conjunctiva protruded between the right lids, and both eyes were blind. The blood showed 20,000 whites, 90 per cent. being polymorphs, and 8 per cent. lymphocytes. There was a complaint of headache and pain over the eyes. Cavernous sinus thrombosis was diagnosed, and on the fifth day of the illness the boy died. Streptococci were isolated from pus at the base of the brain. He was probably, as shown by his rheumatism, specially sensitive to streptococci.

Mr. HUMPHREY NEAME spoke on keratitis in dogs in association with distemper and other conditions, and the discussion was further continued by several members.

Air Vice-Marshal Sir DAVID MUNRO read a paper entitled

Vision in Sports and Games.

The visual factors, he said, were not the only ones concerned in proficiency in games; good muscular coördination and kinæsthetic sense were as necessary as good visual judgment. Instructors should not attempt to train on the motor side until the perceptive side had been investigated, the latter to include the causes of faulty visual judgment. There was a tendency to instruct to a set pattern, apart from personal peculiarity. He classified sports and games into: (1) those in which the player had to follow with both eyes the flight of an approaching or receding ball and to judge its pace; (2) games, such as golf and billiards, in which the ball had not to be followed, but a stroke had to be timed and executed with delicacy; (3) shooting sports, in which the flight of an approaching or receding object had to be followed with both eyes, and accurate timing carried out; (4) the monocular sport of shooting with a rifle at a target; (5) rifle shooting at a moving target; (6) motoring and flying, in which the judgment required was that of one's own pace. The chief visual judgments to be made in games concerned pace, space, and place.

There was a good deal of evidence that imperfect ocular balance was important in causing deficient following of a moving object binocularly, so causing erroneous judgment of distance. The speaker concluded his paper by saying that if he were intending to specialise as a teacher of ball games he would rely on his amblyoscope and stereoscopic charts for correcting the chief sources of visual error.

Papillœdema.

Mr. EUGENE WOLFF (in collaboration with Mr. FRANCIS DAVIES) read a report of work carried out in the Anatomy Department of University College, London, on the Pathology of Papillœdema. The conclusions arrived at were: (1) Non-diffusible dyes injected into the cranial subarachnoid space, at pressures which are compatible with life, do not enter the optic nerve. (2) Claims to have produced papillœdema by injecting fluids into the subarachnoid space at pressures compatible with life were not upheld by this study. Structural reasons were advanced for the special site of commencement of papillœdema in human beings, and for the extent of the distribution of the œdematous fluid associated with papillœdema.

LONDON JEWISH HOSPITAL MEDICAL SOCIETY.

A MEETING of this society was held at the London Jewish Hospital on April 16th, with Dr. LEOPOLD MANDEL, the President, in the chair.

A paper on modern advances in the

Diagnosis of Intracranial Tumours

was read by Dr. GORDON HOLMES. As tumours might occupy any region of the brain, he said, all possible signs of neurological disorder might be produced. Localisation was always interesting, for it could be checked by the surgeon. Treatment had not advanced in the same way as diagnosis and localisation, for 60 to 70 per cent. were gliomata, or spreading tumours, and therefore difficult to extirpate surgically. Herein lay a possible advance in treatment by X rays or radium. The diagnosis of tumour was made by the presence of increased intracranial pressure, evidence of local disease, and symptoms of irritation. Increase of intracranial pressure was brought about either by the size of the tumour itself in the closed cranial cavity, by reactionary changes around the tumour (especially malignant metastases), or by interference with the circulation either of blood or cerebro-spinal fluid. Headache, vomiting, and optic neuritis were the classical signs, but any two of these were sufficient to make one strongly suspect its presence. The diagnosis became certain, when besides increase of pressure there was disturbance of function (depending on the site of the tumour) pointing to local disease; this was usually of slow and gradual development. Irritative phenomena might take the form of local epileptiform seizures, of which tumour was the commonest cause. These sudden disturbances might be brought about either by reaction around the tumour, hæmorrhage into the tumour, or extension involving new structures, or obstruction of the flow of cerebro-spinal fluid—e.g., in the aqueduct of Sylvius.

The signs of cerebral tumour must be differentiated from those of: (1) primary degenerative changes, where there was no rise of pressure, and the lesion was diffuse and bilateral; (2) chronic uræmia, which could be diagnosed from an examination of the urine, blood-vessels, and blood pressure; and (3) cerebral arterio-sclerosis. The mathematical accuracy of localisation was interfered with by disturbances of other parts of the brain by such factors as displacement and the increase of pressure, but in spite of this, by clinical methods alone 80 to 90 per cent. could be localised. Dr. Gordon Holmes drew special attention to disturbances of sensation and of vision with tumours of the forebrain. There was no marked disturbance of cutaneous sensation, but discrimination was affected—that is, the sense of position of the limbs, stereognosis, and the recognition of simultaneous contact of two points in the compass test. As regards visual sensation, there might be gross disturbance of the fields, such as homonymous hemianopia, but on careful examination other disturbances might be found—e.g., visual inattention on the simultaneous exhibition of two objects (in superficial lesions of the parietal and occipital lobes), or visual disorientation (especially in lesions of the left side of the brain).

Recent advances in aids to localisation had proved of little true value. X rays were occasionally useful, but the interpretation of the skiagram was difficult. Pneumo-encephalography was attended by an 8 per cent. mortality, and the more careful the clinician the less use there was for this method. Injection of the carotid artery with sodium iodide solution was dangerous. Auscultation of the skull with the ear, by the presence of a murmur might reveal a vascular tumour or aneurysm; whilst percussion over the skull might reveal a tender area over the tumour. The important point to be remembered was that time and repeated examinations may be necessary before the tumour could be definitely localised.

Mr. JULIAN TAYLOR read a paper on the results of the

Surgery of Intracranial Tumours.

Compared with many other branches of surgery, intracranial operations presented a high mortality, a depressing proportion of complete failures, and of cases where only some of the symptoms were relieved. In contrast there was a small proportion where complete success was attained and a larger where disease was arrested and patients returned to nearly normal health. The variability of the results and the undoubtedly high proportion of failures and partial failures, was to be accounted for by the large number of conditions for which cranial operations were undertaken and by the complexity of their effect on the brain. Percentages were useless in estimating the prospects of a particular case, and to make a prognosis the following seven questions must be answered:—

1. Is the tumour of such a nature that it can be removed by operation or destroyed by irradiation? Most intracranial tumours were malignant infiltrating neoplasms not associated with secondary growths. Some 60 per cent. were gliomas which infiltrated the brain but not its coverings. Their malignancy varied and their growth might sometimes be completely arrested. Only a very small proportion appeared to be amenable to treatment by irradiation at the present time. Some 12 per cent. were endotheliomas ("meningiomas"), which displaced the brain but infiltrated its coverings. Their malignancy was practically constant and their infiltration was so slight that in practice it might almost be neglected. The remainder were for the most part benign—pituitary, acoustic, congenital, and angiomatous tumours.

2. Is the tumour neurologically localised with sufficient accuracy?—A very high pitch of accuracy could be reached, but certain knowledge either of position or of size was not necessarily available.

The visual means by X rays, with or without air injection, lagged far behind.

3. Is the tumour in an accessible place and is it wholly accessible?—Examples of tumours at present partly accessible were subcortical tumours growing deeply towards the corpus collosum or basal ganglia.

4. Has it already destroyed the neighbouring brain so as permanently to abolish function?—Most intracranial tumours when they presented themselves for operation, the neurological signs and symptoms were due more to temporary vascular effect of the growing tumour than to actual destruction, so that removal of a tumour or decompression might result in recovery from symptoms. The visual paths and cortex were exceptions and rarely showed signs of recovery.

5. Has the tumour already caused so great a rise of intracranial pressure as to make removal extremely difficult, extremely dangerous, or impossible?—In spite of the high level attained by neurological diagnosis, a large number of cases presented themselves with high intracranial tension which placed the greatest difficulty in the way of surgical relief. Methods were available for mitigating this danger. Where papilloedema had resulted in atrophy, return of vision was not to be expected.

6. Are there difficulties special to the tumour?—There were difficulties special to most tumours—e.g., tumours in the neighbourhood of the left Sylvian fissure or of the left motor cortex were rarely susceptible of removal on account of aphasia and right hemiplegia. Tumours in the posterior fossa were dangerous on account of hæmorrhage from cerebellar vessels and of the proximity of the medulla, which prevented any but the slightest manipulation.

7. In the likely event of an unfavourable answer to any of the six preceding questions, is a measure of relief possible or can palliation be achieved?—For decompression to produce relief, it must be over the tumour. Where there was hydrocephalus, decompression might give little relief, especially in the posterior fossa. The site of obstruction to the cerebro-spinal fluid pathway, whether on its outward or return flow, was an important factor in the posterior fossa. Decompression either above or below the tentorium was rarely beneficial in tumours obstructing the incisura tentorii.

Mr. Taylor concluded by giving a short résumé of results in glioma, endothelioma, pituitary, acoustic, and hæmangiomatous tumours. In gliomata the results were doubtful—i.e., variable. In endothelioma the progress depends on size and length of time preceding the increase of intracranial pressure; recurrence in the coverings was unfortunately too frequent. Pituitary tumours in some cases could be successfully operated on, but deep X ray therapy seemed to hold some hope. More knowledge of this form of therapy was awaited. Diathermy in the removal of some growths had met with success.

The PRESIDENT said that members of the society, having heard the two speakers, would in future approach cases of growth of intracranial cavity with a little more optimism than hitherto.

Mr. H. S. SOUTTAR pointed out that the symptoms displayed by the patient were often quite out of proportion to what was found at operation. A very small tumour might give rise to an immense hydrocephalus, whilst on the other hand he had had a case in which a huge tumour of the parieto-frontal region caused no symptom except extreme cheerfulness.

Dr. M. SCHWARTZMAN gave details of a case of pituitary tumour alleviated by radium.

Mr. S. I. LEVY recorded a case of cerebral sarcoma, treated by radium after decompression; the patient had lost his symptoms and was now carrying on a normal life.

Dr. GORDON HOLMES, in reply, thought there was a future for X ray therapy in certain types of tumours. With radium, the results at Queen-square had so far been disappointing.

NORTH OF ENGLAND OBSTETRICAL AND GYNÆCOLOGICAL SOCIETY.

AT a meeting of this society at Liverpool, on March 20th, Mr. ST. GEORGE WILSON read a paper on

Lower Uterine Segment Cæsarean Section.

He reported the result of 50 of the 54 cases of which full details were available and in which he had used this incision. Twenty-three patients were primiparæ, 27 multiparæ, and 15 had had previous Cæsarean sections. In 22 of his cases there was general contraction of the pelvis and in 14 flat pelvis. There was one case of oblique contraction and one of disproportion, which Mr. Wilson agreed with Mr. Leyland Robinson in ascribing mainly to deflection of the head due to or associated with imperfect functioning of the uterus. Pelvic tumours were present in four cases. In two cases operation was done on account of cardiac condition. The remaining five comprised three patients with bad obstetrical histories, one with prolapse of the cord, and one elderly primipara with a breech presentation and rupture of the membranes of four days' duration.

The lower uterine segment incision, said Mr. Wilson, extended the indications for operation. He thought that it also tended to diminish the number of operations performed. The text-book measurements of the pelvis were, he thought, well above normal and a large number of cases labelled "generally contracted pelvis" would deliver themselves if given the chance of a trial labour. His operation-rate at Walton Hospital was 1 in 14·3 deliveries. The average duration of labour in his 50 cases was 15·3 hours, the period of labour allowed being regulated by the condition of the fœtus alone. The longer the labour the simpler the operation. Reported cases showed that the morbidity-rate was greater in classical than lower segment Cæsarean section. The speaker agreed with Munro Kerr that the uterine wound was infected from the interior by an ascent of bacteria from the vagina. In his own series, excluding six cases of pulmonary condition and one of pyelitis, five were notifiable under the pyrexia Act, a morbidity-rate of 10 per cent. The average stay in hospital was 19·4 days.

Besides its immediate importance, he considered that sepsis had a bearing on future pregnancies and labours. He thought, however, that the situation of the placenta over the previous scar was the important ætiological factor in five of the six cases of rupture he had reported to the society. It was stated that the placenta was attached to the anterior wall in 40 per cent. of pregnancies. Apart from the absence of placental attachment, the lower segment had the advantage that it bore no stress during pregnancy or early in labour when rupture was most likely to occur in the classical scar.

Among the children there was one stillbirth, a hydrocephalic with spina bifida, and two neonatal deaths, one soon after delivery, the other at ten days from gastro-enteritis.

A film of the operation was then shown and described. A catheter is kept in the bladder till the patient was put on the table. The position used is a moderate Trendelenburg.

The abdomen is opened by a mid-line subumbilical incision and a large Doyen retractor introduced. After careful packing off, a curved transverse incision is made as low down as possible in the utero-vesical pouch. The bladder is not pushed down and a similar curved transverse incision is then made through the lower segment, the lateral extensions of the incisions being made with scissors. Pressure on the fundus forces the head down and delivery is assisted by means of one blade of Simpson's forceps used as a vectis. Traction on the head then completes delivery. The placenta as a rule separates at once and is delivered by traction on the cord. At this stage an injection of ergotamine phosphate and histamine is given intramuscularly. The incision is then closed by continuous catgut sutures in two layers, the decidua being avoided and the cut edges inverted. A third continuous suture closes the peritoneum. Graf's No. 3 catgut is used throughout.

Mr. Wilson said he had never left the placenta to be delivered per vias naturales. In conclusion he referred to the easy convalescence of these cases, the absence of intestinal complications, and the advantage of confining any infection to the pelvis and behind a loosely attached peritoneum rather than allowing it to spread through the adherent upper-segment peritoneum to the higher parts of the abdominal cavity.

Prof. BLAIR BELL showed a uterus with attached portion of colon removed at operation for a utero-colic fistula due to carcinoma. He also described a case of intra-uterine pregnancy occurring after conservative operations for different lesions first on one tube and later on the other.—Prof. Blair Bell and Mr. Leyland Robinson each described cases of fibromyomatous uteri simulating pregnancy.—A specimen of torsion of a hydrosalpinx was demonstrated by Mr. N. L. Edwards (Derby) and Mr. St. George Wilson showed a uterus which had spontaneously ruptured during unassisted delivery of the child.

LIVERPOOL MEDICAL INSTITUTION.

AT a meeting of this institution on April 16th, with Prof. W. BLAIR BELL, the President, in the chair, a discussion on the care of

The Child from Birth to School Age

was opened by Dr. LEONARD FINDLAY (London). Although infant mortality had improved considerably during the last 30 years it still remained, he said, a very serious problem. Until 1913 the death-rate was higher in England than in Scotland, but since then the reverse had been the case. One of the chief reasons for this reversal was the relative disappearance of epidemic enteritis, which was always more severe in England owing to climatic conditions. However, the simultaneous fall in deaths from this cause in various towns in Britain, Europe, and America suggested that the disappearance was in response to natural laws rather than as the result of any human efforts. Measles and whooping-cough were responsible for a large proportion of infantile deaths, and he suggested that one method of combating these diseases would be the provision of housing accommodation in order to lessen the density per unit area of the population, thus decreasing the opportunity for the spread of the infection. He agreed that the relatively more rapid fall in the infantile death-rate in England might be partly due to the intensive child welfare movement there, and quoted the fact that in England the deaths from convulsions and debility had fallen 200 per cent. since 1911, whereas in Scotland the fall amounted to 25 per cent. at the most. He emphasised, however, that there must not be too much supervision, or at least ill-directed interference with nature—a prevailing state of affairs as suggested by the rise in deaths from injury at birth, and rendered still more probable by the simultaneous increase in maternal deaths. Between birth and school age environmental conditions exerted their greatest effect. Tuberculous infection was then most prevalent and deaths from tuberculosis were more numerous during the first year than during any single year thereafter. It was difficult to estimate the amount of tuberculosis contracted during early life, for often it did not declare itself until later, but it was known that much of it was due to the bovine tubercle bacillus transmitted by milk, and consequently preventable. He urged, therefore, that no efforts be spared to secure a pure milk-supply. The provision of tubercle-free milk must apply to rural districts as well as to the large cities, for there was good reason to believe that bovine tuberculosis was relatively more prevalent in rural districts and small towns.

Dr. NORMAN CAPON quoted figures to show that, in spite of the gratifying reduction in the infantile death-rate during the present century, there had been only a slight fall of mortality-rate during the first four weeks of life. Every new-born baby still passed through a period of great danger to life; and when he survived he might have suffered damage which would jeopardise his future. It was an appalling fact that 47,868 infants died in England and Wales during 1929 before they reached the first anniversary of their birth, and that 21,136 of these babies did not survive the neonatal period. During the same year the total maternal deaths numbered 2787. Close coöperation was needed between obstetricians and pædiatricians. The former were in a position to employ prophylaxis when it might reasonably be expected to be most fruitful. It could be divided—to quote Eardley Holland's happy phrase—into the strategy of obstetrics (antenatal supervision) and the tactics of obstetrics (conduct of the labour).

Dr. H. R. HURTER said that the healthy child of 4 or 5 needed better exercise than the long monotonous walks alongside the perambulator of his younger brother; outdoor games and the garden sand-heap were favoured. He thought the incidence of measles amongst Liverpool's middle classes would be lessened if the annual civic children's party were held in May or June instead of in January. Dr. Hurter said that acidosis had become too fashionable a diagnosis. Parents had now the same dread of this word that the whole nation had of the term "blood pressure" less than a generation ago.

Dr. A. DINGWALL FORDYCE said the modern conception of medicine was wide, and so far as the care of the young child was concerned could be considered as composed of purely physical care and of mental care, with the very important inclusion of wholesome neglect. The object in early years must be to preserve normality, and rational care must be under medical supervision. A unified medical service was necessary, and in order that such service be capable and reliable undergraduate instruction in pædiatrics must be developed.

The PRESIDENT said that he had long been of the opinion that obstetricians should surrender the care of the child from the hour of birth to the pædiatrician. During the last 20 years he had himself seen a great change in obstetrical interest in the life and freedom from injury of the child. Whereas formerly the baby received scant consideration, now, while the interests of the mother still had, and always would have, a prior claim, the life of the child was always taken into consideration of the best method of delivery.

He was, therefore, somewhat surprised to hear Dr. Findlay state that the percentage of birth injuries had been doubled. He thought this statement was not strictly true, and was probably due to the fact that the frequency of fatal intracranial hæmorrhages was not realised until a few years ago. Pædiatricians were responsible for the production of the healthy mothers of the next generation. The reduction of the maternal mortality depended largely on the prevention of contracted pelves, not only those due to rickets but also those, such as round pelves, due to postnatal developmental errors. So too the disappearance of infections, including rheumatism in juvenile life, would diminish the number of cardiac, renal, and arthritic maternal cripples.

REVIEWS AND NOTICES OF BOOKS

Fractures and their Complications.

By GEORGE EWART WILSON, M.B. Tor., F.R.C.S. Eng., F.A.C.S., Surgeon-in-Chief, St. Michael's Hospital, Toronto; Assistant Professor of Surgery, University of Toronto. London: Baillière, Tindall and Cox. 1931. Pp. 415. 35*s*.

THE routine use of radiography in the recognition and treatment of fractures has altered the clinician's attitude, and though it is still considered essential to impress upon students the signs by which to appreciate displacements characteristic of particular injuries, the surgeon is mostly concerned in diagnosis with X ray appearances. So it is with this author, whose book is thus adapted to the needs of the post-graduate rather than to those of the student. Nevertheless, the opening chapters, devoted to the morbid anatomy of fractures, their effects and processes of union, provide an attractive general exposition, and show the author to be a surgeon as well as the skilled mechanic that the later pages reveal. Frankly a personal work, the book describes Prof. Wilson's own methods with little reference to tradition or to the modern procedures of others, and it contains much which will stimulate controversy. The section devoted to cranial injuries properly emphasises the coexisting cerebral lesions, but the reference to the characters, prophylaxis, and management of the intracranial infections associated with fracture of the anterior fossa is so meagre as to mark an omission. In fractures of the limbs Prof. Wilson insists on the importance of fluoroscopic examination during reduction, an ideal not always to be reached in this country even in large hospitals. The treatment of the fractures of the upper limb is in accordance with the orthodox practice of the present day. The possibility of recurrence of deformity in Colles's fracture following premature relaxation of palmar flexion is duly noted, but we cannot agree that with fixation in flexion over-correction is impossible. The management of the femur here recommended is again orthodox, though no mention is made of the Thomas walking calliper during the early months of union. For the leg we should like to see some account of the ambulatory methods of Delbet, their indications and dangers, as an alternative to the prolonged plaster fixation recommended. The book is closely but well printed on clay paper and the illustrations are apposite, though the reproduction of the radiograms is not of uniform excellence.

Pye's Surgical Handicraft.

Tenth edition. By H. W. CARSON, F.R.C.S., late Senior Surgeon to the Prince of Wales General Hospital, Tottenham. Bristol: John Wright and Sons, Ltd. 1931. Pp. 641. 21*s*.

THIS latest edition of Pye was completely revised by Herbert Carson before his death and shows many signs of the thoroughness with which he always carried out his work. As a guide for house surgeons it remains unrivalled. Its usefulness is much enhanced by the collaboration of experts in certain of the specialties, though it seems unnecessary to procure a special description of the use of the Thomas splint, the great advantage of which is the simplicity of its underlying principles and application. We have tested the book from the house surgeon's point of view and find it likely to be helpful in almost any emergency and in most of those minor procedures which he is called upon to perform. In future editions help might be offered on the use of hypertonic magnesium sulphate in the treatment of head injuries, the dosage and details of administration of tetra-iodo-phenolphthalein, the preparation of the patient for sigmoidoscopy, the dosage of glycerin in an enema, the Dickson Wright treatment of varicose ulcer, the use of glucose saline and of insulin for shock, and the preparation of diabetics for operation. It is a great achievement for the editor to have freed himself from the trammels of tradition and arrangement and to have produced an edition which fulfills the requirements of the modern house surgeon as efficiently as did the original one when it was issued nearly 40 years ago.

Ultra-violet Radiotherapy.

By W. KERR RUSSELL, M.D., B.S., Medical Officer in Charge Light and Electrical Department, Miller General Hospital for South-East London. Modern Treatment Series. London: Jonathan Cape. 1931. Pp. 130. 5*s*.

IN a short note Dr. F. G. Crookshank, the general editor of the series to which this book belongs, states that the aim of these small volumes is to give practitioners an opportunity to obtain in convenient form and at small cost reliable guides to the present practice, and best opinion in some of the many branches of medicine and surgery. Considering the limitations of size imposed on him, and the difficulty of summarising a controversial subject, Dr. Kerr Russell has accomplished his task remarkably well. His exposition is lucid, dogmatic by necessity, but very accurate. The medical reader who is unfamiliar with the subject will not be puzzled by superfluous technical terms, and will not be irritated by the adoption of the "popular" style commonly associated with elementary manuals. More space could profitably have been allotted to physiological considerations and less to descriptions of apparatus. We question also whether a detailed description of the technique employed in treatments with the Finsen-Reyn lamp serves a useful purpose in a book of this scope. Anyone who might feel tempted to treat a case of lupus, for which this lamp is so frequently and successfully employed, after learning the very difficult technique in a book, will find that he has to learn all over again from his mistakes, a method not likely to benefit either the practitioner or the patient. Another omission in the introductory remarks is of some practical importance. Enumerating the type of cases which a biophysical assistant should not treat without direct medical

supervision, Dr. Kerr Russell mentions pulmonary tuberculosis associated with hæmoptysis, but no other type of tuberculosis is specifically mentioned. All cases of tuberculosis, and more especially of phthisis, should be under direct medical supervision, and it is especially in the early or quiescent cases of pulmonary tuberculosis that irreparable damage can be done by injudicious light treatment. There are not many such omissions, and this small volume will be found informative and readable by both medical and lay workers.

Lectures on Diseases of Children.

Sixth edition. By ROBERT HUTCHISON, M.D., F.R.C.P., Physician to the London Hospital, and Hospital for Sick Children, Great Ormond-street. London: Edward Arnold and Co. 1931. Pp. 487. 21*s*.

A NEW edition of this work from which so large a number of students and doctors have obtained instruction and pleasure is always of interest, especially to those who have watched its evolution from a short series of well-chosen lectures to a volume which has achieved the completeness of a text-book and yet retained the characteristic style of the author's clinical teaching. In the sixth edition minor alterations have been made throughout the text; the lecture on the dyspepsias of childhood has been rewritten and a somewhat different classification adopted. Three new chapters have been added, dealing respectively with diet after the period of infancy, with asthma, and with chronic splenomegaly. The first of these adds greatly to the value of the book as a practical guide to routine work, and should act as a wholesome antidote to some of the faddy and pseudo-scientific suggestions with which the student is often beset. The lecture on splenomegaly provides a clear account of the difficulties of differential diagnosis in these conditions. This new edition will add to the influence which Dr. Hutchison's work exerts on the study of pædiatrics.

Clinical Nutrition and Feeding in Infancy and Childhood.

By I. NEWTON KUGELMASS, M.D., Ph.D., Sc.D., Associate Attending Pediatrician, Fifth Avenue Hospital; Riverside Hospital; Director, Heckscher Institute for Child Health. London: J. B. Lippincott Company. 1930. Pp. 345. 25*s*.

THE aim of this book is to interpret the science of nutrition for the benefit of the practitioner of medicine, or, as the author expresses it in the preface, "to temper scientific severity for clinical clarity." The result is that the practical problems of the feeding of infants and children in health and disease are presented as though no problems remained to be solved. Most of the paragraphs are preceded by a brief summary in heavy type of the argument that is to follow, and a selection of these headings will indicate the manner in which controversial subjects are treated. "Hypersensitiveness develops in utero as the result of the mother's over indulgence in certain protein foods." "Potential hæmorrhagic disease of the newborn may be prevented by prenatal feeding rich in protein and fat." "Acute intestinal intoxication in infancy is the result of an abnormal concentration of the blood." "Humanised dried milks are fool-proof feeding mixtures." It is true that much useful practical advice is contained in this volume, but it will scarcely appeal to those who believe that the science of nutrition has a future.

How You Work: An Introduction to the Human Body.

By ISABEL WILSON, M.D. London: Gerald Howe, Ltd. 1930. Pp. 178. With 16 text-figures. 3*s*. 6*d*.

ABOUT 250 years ago Robert Boyle urged that it was "highly dishonourable for a reasonable soul to live in so divinely built a mansion as the body she resides in altogether unacquainted with the exquisite structure of it." If a child is a reasonable soul, we know of no introduction to the body and its working so well calculated to save him from a dishonourable ignorance. Whether young children—the wrapper mentions "8 years and upwards"—are quite reasonable enough is a question for pedagogues.

Clio Medica: Physiology.

By JOHN F. FULTON, M.D., Sterling Professor of Physiology, Yale University. New York: Paul B. Hoeber. 1931. Pp. 141. $1.50.

ARISTOTLE taught that animals live by virtue of their "innate heat." "The existence of life is coupled with the preservation of the heat aforesaid, and what is called death is the destruction thereof." It was some 2000 years later that Helmholtz proved that muscular contraction is associated with the evolution of heat, and by indicating the chemical transformations which produce this form of energy in the living tissues laid the foundations of biochemistry. It has been Prof. Fulton's task to indicate in broad outlines the main structure of physiological development in the space which separates these epochs. This he has done effectively; by tracing the history of knowledge with regard to the three great subjects of circulation, respiration, and digestion, and he has added a final chapter upon the rise of the modern laboratories and the trend of physiological research. He deprecates the tendency to pursue physiology too slavishly in the terms of the exact sciences and to lose sight of the great problems of integrated function in the fascinating and more exact bypaths of electrochemistry and biophysics. The production of a small readable handbook of this kind is a considerable achievement. The author has the gift of discretion and a sense of proportion. We have read the book with great pleasure and commend it to all those interested in the evolution of our knowledge of human function and, above all, to all students of medicine. We have detected only one inaccuracy. The author remarks that the Waynflete chair at Oxford, created in 1878, was the second chair of physiology to have been founded in Great Britain, Edinburgh having been the first. In this he is unfair to the University of Glasgow, which had, as early as 1832, a lectureship in the "Theory of Medicine" which was transformed into a chair of the "Institutes of Medicine" in 1839. The first occupant of the chair was Andrew Buchanan, who held it until 1876 when he retired under pressure, permitting himself in his valedictory address to explain to his students how a professor, who had no intention of retiring, might be got rid of *malgré lui*. Buchanan was succeeded in 1876 by McKendrick, when the title of the chair was changed to that of Physiology.

THE price of "Physiological Chemistry," Fifth edition, by A. P. Mathews, published by Messrs. Baillière, Tindall and Cox, is 31*s*. 6*d*., not 15*s*. as stated last week.

THE LANCET.

LONDON: SATURDAY, MAY 2, 1931.

HOSPITALS AND PAY-BEDS.

THE plight of the voluntary hospitals is illustrated by the application last week to the Chancery Division for a scheme to increase the number of pay-beds in the Miller General Hospital for South-East London to 50. The board of management obtained the approval of the Charity Commissioners in January, 1929, to a scheme authorising the appropriation of not more than 15 pay-beds, for which a patient would be charged not more than £7 a week. The whole income of the hospital is derived from voluntary subscriptions, donations, and legacies, and from grants from King Edward's Hospital Fund. In 1929 the total income (including legacies) was under £35,000, as against expenditure of over £38,000. The deficiency of £3781 for 1929 has been estimated as likely to rise to £6394 for 1930. The board of management is able to make the point that the district of Greenwich and its environs has greatly changed its character, and now contains few inhabitants of more than small or moderate means; it is not anticipated that the annual subscriptions and donations can be kept up at the present level. In these circumstances the Charity Commissioners were asked to sanction an increase in the pay-beds, and the Commissioners referred the matter to the Court.

Counsel for the hospital said that either there must be more paying patients or else some of the wards must be closed; to close 74 beds would save £2071 in expenditure, but this would not solve their problem; the only solution, in the view of the board of management, was to establish more pay-beds. Counsel sought to support the change under what lawyers call the *cy-près* rule. This is a doctrine whereby the property of a charity is to be applied as nearly as possible to the donor's intentions; where the scope of the charitable purpose has ceased to exist—for instance, where charities exist for the release of captives imprisoned by the Barbary pirates—the doctrine enables the application of the charity to be varied. On behalf of the Attorney-General, who appears in these cases in order to represent the public interest, it was argued that the *cy-près* doctrine could be applied only if the proposed scheme was the sole possible method of obtaining financial relief. The Attorney-General was stated to be sympathetic to the financial difficulty, but unable to agree to a proposal which meant that one-third of the beds would become pay-beds, when under its rules the hospital existed to provide "free medical and surgical relief and assistance for necessitous poor." It was suggested that the hospital might get help in some other way, by applying to the Ministry of Health or to the London County Council under the Local Government Act, 1929. The Court adjourned the application for a fortnight to give an opportunity for the production of further evidence that all possible alternatives have been considered—though this fact would seem to have been already established. The Attorney-General seems to have hinted that he will favour an increase of pay-beds from 15 to 30—at any rate for an experimental period of 12 months—if it is proved, first, that there is no other way of obtaining relief; and, secondly, that without this relief a large part of the hospital must be closed or carried on in a very different way. The applicants had asked for the increase to 50 either during a limited period or otherwise.

Other hospitals, similarly placed, will watch the case with interest. Continuous increase in taxation dries up voluntary subscriptions, and there are disturbing influences at work for the future.

MEDICAL PATENTS.

THE problems involved in patents of therapeutic substances are of relatively recent origin. It was not until the late war caused a lack of certain drugs, many of which were subject to patent rights in this country, that the question came before the attention of those concerned with patent rights. The result was Section 38A of the Patents and Designs Act, 1919, which enacted that the comptroller might grant a licence for the preparation of a food or medicine, and should settle the terms of the licence and the amount of the royalty with due consideration for making the food or medicine available to the public at the lowest possible cost, while allowing the inventor a proper reward for his research. This measure aroused considerable controversy in certain quarters, and still further publicity was given to the matter by the alleged commercial abuse of certain medical discoveries and the safeguarding by patent rights of insulin and other new preparations. A large section of the medical profession refused to sanction medical patents in any form, and the British chemical manufacturers declared that their work was being handicapped by this attitude, since it was not shared by many foreign workers. The question came before the representative body of the British Medical Association last year.[1] The attitude of the Association's ethical committee was that a registered medical practitioner ought not to derive any financial benefit from any medical invention or discovery, but that, on the other hand, medical practitioners could not desire to hinder industry or commercial research. A motion to affirm the old ethical position was referred back to the council on the ground that under modern conditions patents must be taken out, for the sake of the

[1] THE LANCET, 1930, ii., 256.

public as well as of the manufacturers. The council has once more considered the matter and recommends that the representative body shall this year express the opinion that medical men inventing or discovering substances or processes likely to be of therapeutic value may with propriety use the arrangements allowed by the law for protecting them. They may also accept a just reward, subject to the traditional ethical principle that they must not act against the public interests by unduly restricting the use or knowledge of inventions for their own gain.[2] How this suggestion will appeal to the representative body remains to be seen.

Meanwhile the Board of Trade has published a report[3] on the subject. The departmental committee heard evidence from—among many others—a joint chemical committee representing several institutions and from the British Medical Association and the Medical Research Council. The joint chemical committee suggested a scheme by means of which dedication would be compulsory for all patents taken out for inventions subserving medical purposes. It was argued that this would assist publication, preserve the British worker from exploitation and prevent any uncontrolled monopoly. The proposal was supported by the representatives of the British Medical Association and the Medical Research Council, but was opposed by a number of other witnesses, chiefly on the ground that any further restrictions on medical patents would discourage research or encourage secrecy. The committee, after very careful consideration, came to the conclusion that dedicated patents would discriminate unfairly against research workers and the fine-chemicals industry in this country and that a sufficient case had not been made out for their adoption. The committee do, however, recommend an alteration in the section where it says: "In the case of inventions relating to substances prepared or produced by chemical processes or intended for food or medicine, the specification shall not include claims for the substance itself, except when prepared or produced by the special methods or processes of manufacture described and claimed or by their obvious chemical equivalents." A decision of the law officer on the word "special" in this section had led in some cases to the refusal of patents for inventions produced by processes which could not be said to contain features of substantial novelty. The word "special" has enabled the Patent Office to refuse applications for mere prescriptions but, as a result of their attempt to hold the balance between avoiding the encouragement of futile claims and not unduly hampering invention, the committee have decided to recommend the substitution of the word "particular" for the word "special," together with the addition of a proviso stating that a mere admixture resulting in an aggregation of the known properties of the respective ingredients shall not be deemed to be a particular process of manufacture.

[2] Brit. Med. Jour., Supplement, April 25th, 1931, p. 139.
[3] Report of the Departmental Committee on the Patents and Designs Acts and Practice of the Patent Office, 1931. H.M. Stationery Office. Pp. 104. 1s. 6d.

MOTTLED TEETH.

THE enamel of the teeth, until destroyed by disease or old age, remains as an outward and visible sign of metabolic disturbances occurring in the first three or four years of life. While this statement can hardly be challenged, it does not mean that enamel, once formed, remains unaltered by nutritional changes, for the work of J. H. MUMMERY, E. SPRAWSON, E. W. FISH, and others has shown that enamel is a vital tissue capable of reacting to metabolic changes. But these changes affect the intimate structure of the enamel without changing its outward appearance, so that defects present when the teeth erupt are still apparent in adult life. This defective structure, conveniently termed hypoplasia, may be produced in various ways. A severe honeycombing of the enamel may be associated with rickets. A narrow zone of defective enamel forming a ridge or series of pits running transversely across the crown of an incisor may be caused by childish diseases such as measles or diphtheria. In animals, as Mrs. MELLANBY has shown, an absence of vitamin D in the diet may bring about defective enamel formation, with the inference that a similar food deficiency may be responsible for dental hypoplasia in man. It is often possible by examining the teeth to state with fair accuracy the time and duration of some disturbance of metabolism which occurred many years previously. An interesting form of hypoplasia is one described by G. V. BLACK and F. S. MCKAY as mottled teeth. In this condition, while the teeth are of normal form, the cementing substance uniting the rods which form the bulk of the enamel is stained brown or yellow, less commonly opaque white. According to MCKAY, the staining does not occur until after eruption, but it is always preceded by the characteristic mottling. On chemical analysis the stain has been found to contain manganese.

The first account of mottled enamel was given by J. M. EAGER, of the United States Public Health Service, who noticed its frequency among Italian emigrants from Pozzuoli, near Naples. BLACK and MCKAY have since described its occurrence in Colorado, Texas, Virginia, Arizona, and other parts of America; it has been found to exist in regions as far removed from each other as the Bahama Islands, China, Holland, and South Africa. Wherever it occurs the appearance of the enamel is the same. BLACK and MCKAY came to the conclusion that the defect is due to some abnormal constituent of the water supply; but so far the exact nature of the causal agent and the way it acts remain unknown. The latest contribution[1] relates the occurrence of mottled enamel in Bauxite, Arkansas, a community established in 1901 to provide homes for a mining company. The original water supply was from shallow wells and a few springs, but as the population increased three deep wells were dug and the water piped into the homes; the shallow wells were filled in and the sole supply was from the

[1] G. A. Kempf and F. S. McKay. U.S. Public Health Reports. Nov. 28th, 1930.

deep wells, the water of which had a disagreeable alkaline taste. A careful examination of the school-children was carried out, and the results correlated with the known dates when the water supply was changed; it was found that no cases of mottled enamel antedated the introduction of deep well-water. The oldest individual with enamel defect was born about the time the deep wells were used. All those who had used the deep well-water during the period of tooth formation had mottled enamel; no child in the town who had lived elsewhere while the teeth were being calcified had this defect. Certain individuals resident in the town and attending school there, but living beyond the area of the distribution of deep well-water, had normal enamel. The strict dependence of the defect on some factor affecting the whole community is shown by the results of the examination of 14 people from 15 to 24 years who had lived in Bauxite two years or more during the period while the wisdom teeth were being formed. The teeth showed clearly that the incidence of mottled enamel depended on the periods when they had lived at Bauxite. In one person who came to the town at four years the incisors had escaped, for they began to calcify previously, but the remaining teeth, including the wisdom teeth, were affected. Another was born at Bauxite and lived there all his life; all the teeth were affected. Eight individuals came to Bauxite between 8 and 12 years, and only the wisdom teeth showed the enamel defect. To serve as a control the children of a neighbouring town were examined. None of them showed mottled enamel, except a certain number who had lived at Bauxite for varying periods during enamel formation.

The data gathered in this survey clearly indicate that there is a specific agent or condition in the environment of the town of Bauxite which affects the formation of the enamel of the permanent teeth. This agent is limited to the town, for children living outside escaped. It did not seem probable that food could be the factor, for the mode of life and the diet was the same in the town as in surrounding communities, and the population was attacked irrespective of social status. But while the evidence pointed strongly to the water supply as the incriminating agent, analyses of the water threw no light on the nature of the causative factor. An interesting sequel to this investigation was that steps were at once taken to abandon the deep well supply, and to substitute for it water brought from an adjacent town in which mottled enamel did not occur. This involved piping the water for four miles and passing it through a filtration plant. Bauxite is, we believe, the second community in the world to abandon an apparently satisfactory water supply solely because the evidence suggested that its use was responsible for defective structure of the teeth. A further survey of the community is promised at a later date to ascertain whether the change will bring about the disappearance of mottled teeth. But for this survey we must wait six or seven years.

ANNOTATIONS

IRRIGATION NEW AND OLD.

In a country like Bengal a right policy for irrigation implies not only cheap food and other necessaries but healthy surroundings for the agricultural millions. Sir William Willcocks in a series of lectures now reprinted [1] considers that a wrong policy has been adopted for the last 70 years, with results in certain areas which appalled the delegates of the League of Nations when they made a malaria tour of India some time ago. The history of irrigation systems is full of interest. Six thousand years ago the Egyptians introduced basin irrigation in the Nile valley, digging canals which remain in use to-day. At about the same period the Babylonian kings started perennial irrigation in the joint delta of the Euphrates and Tigris. Three thousand years later, in the light of the ancient knowledge, the Chola kings of Bengal evolved a system of overflow irrigation which led to an era of health and wealth such as central and eastern Bengal have never equalled since it was abandoned. If the views put forward in these lectures are justified—and there is evidently an increasing volume of informed opinion in their favour—the record of irrigation under British auspices in Bengal is deplorable.

Conditions in the Ganges delta are of course widely different from those in Egypt, which is practically rainless, and Babylonia, where there is little rain. A great part of Bengal enjoys an annual rainfall of 50–60 inches. This comes just when all the rivers are in flood, and it was to make full use of the rich waters of the Ganges and Damodar floods, in conjunction with the abundant but poor water of the monsoon rainfall, that the system of overflow irrigation was instituted. Unfortunately the canals were neglected and fell into disuse in the disturbed period which followed the Mahratha-Afghan wars of the eighteenth century. According to Willcocks these works were carried out on the soundest principles. The Damodar was closed and diverted, recalling similar feats performed by the ancient Egyptians when they diverted the Nile to protect the temples of Memphis, and by the Babylonians who turned the Tigris out of its course. In the Ganges and Damodar areas some seven to ten million acres of land were eventually irrigated. The canals still remain as "dead rivers," which have wandered somewhat from their original straight course, owing to the uncontrolled action of the waters, but would still serve their purpose. All they require is re-excavating. In the nineteenth century however the government adopted an irrigation policy which Willcocks holds to have been mistaken. Overflow irrigation on the ancient lines is, he thinks, the only method suitable in Bengal. The Irrigation Department has tried every other kind of project, and all have failed.

When Bernier visited Bengal about the year 1660 he considered it "richer than Egypt." There were immense herds of pigs and goats, and flocks of sheep; fish of every kind abounded; rice, sugar and butter, cotton and silks, were exported in large quantities. A magnificent system of canals served for both navigation and irrigation. Great tracts of country

[1] Four Lectures on the Ancient System of Irrigation in Bengal and its Application to Modern Problems. By Sir William Willcocks. Calcutta: University Press. 1930. Pp. 128.

present a very different aspect to-day. The canals are silted up. Railway embankments and roads have obstructed the natural drainage, with the result that large areas have become waterlogged, or gone out of cultivation, and malaria, which was apparently not excessively prevalent in the ancient times, has become a national plague. The fish supply—formerly a very important factor in the diet of the people—has diminished, owing to the absence of the ova which used to be distributed broadcast by the muddy inundations, which also fertilised the soil. The fry which hatched out from these ova played an important part in keeping down mosquitoes, and there is good medical authority for the statement that the increase in malaria has been partly due to the elimination of this factor. Prof. C. A. Bentley is strongly of this opinion in his book "Malaria and Agriculture," while Dr. Bruce Mayne, in a malaria survey of Tanjore where the overflow system prevails, has come to the conclusion that irrigation of this kind stamps out malaria. The disease was only prevalent in the dry parts, in marked contrast to ordinary clear water irrigation where malaria follows the canals.

Sir William Willcocks's historic work in Egypt and Mesopotamia gives him a peculiar claim to speak on irrigation, and when he urges that the modern policy in Bengal needs reconsideration his views should command attention.

OCCUPATIONAL NYSTAGMUS.

IT is often taken for granted that occupational nystagmus is confined to miners, but in the *Journal* of the American Medical Association for April 4th Dr. Carey P. McCord describes its extensive occurrence in train dispatchers, whose work involves following the continual motion of a large paper train sheet, whilst making rapid decisions upon which may depend life and death for passengers or crew. Among 121 subjects 67 per cent. showed nystagmus, 65 per cent. showed deviations from the normal mental state, of which anxiety neurosis was the most common, and 82 per cent. showed cardiovascular disorders. The combination of these signs and symptoms in individual cases was not recorded, but they have apparently the same erratic association as that found in workers in safety-lamp mines. Dr. McCord seems to have been influenced by English writings on miners' nystagmus, and three ætiological views can be extracted from his account: (*a*) the nystagmus may fit into a general fatigue syndrome characterised by nystagmus, intention tremors, tremors of other portions of the body, such as the eyelids, tachycardia or brachycardia, anxiety neurosis, and vasomotor disturbances; (*b*) anxiety neuroses are a natural product of the usual stress and strain incident to the responsibilities of train dispatching in safely moving trains; and (*c*) the high frequency of the use of eyes in connexion with train sheet work leads to overworking of the ocular mechanism, resulting in a nervous syndrome characterised by nystagmus, blepharospasm, some visual impairment, and ocular discomfort. Another association of nystagmus with neurosis, this time in workers on maritime cranes in the port of Genoa, was described by Tedeschi in 1908 in *Ramazzini* (an Italian public health journal now defunct). He emphasised the dangers and discomforts of the work and the need for constant watching of the hook on the end of the chain by which goods were hoisted, and described a resulting disorder that he called "fear neurosis." Some of the subjects of this disorder (29 per cent.) showed nystagmus, but Tedeschi regarded the neurosis as the important and primary condition. It is noteworthy that in each of these examples, as in miners, there is a curious association, not always in the same subjects, of the typical nervous results of danger and stress with oscillation of the eyeballs. In miners there is the additional fact that the majority of men who show oscillation suffer from no symptoms whatever. The orthodox belief that oscillation of the eyeballs causes the nervous symptoms in miners' nystagmus is challenged by psychopathologists, and these examples from America and Italy suggest that the application of statistical methods may support the view that psychoneurotic syndromes in miners do not possess a unique pathology but fall into line with what is known about the general ætiology of anxiety states. Whether the oscillation is a harmless manifestation whose association with the psychoneurosis is haphazard, or whether it is itself merely an accidental part of the psychoneurotic syndrome called forth by special circumstances of ocular stress, will remain an interesting if unimportant problem.

HÆMOSIDERINURIA.

A CASE of hæmosiderinuria has recently been described at length by Prof. Ettore Marchiafava, of Rome.[1] Hæmolytic anæmia with presistent hæmosiderinuria is a form of anæmia not yet classified, and consists in a chronic progressive fatal anæmia, without splenomegaly, and with intense hæmosiderosis of the kidneys alone.

The patient, an airman, was 32 years of age, and began to suffer in 1923 from anæmia with a red-cell count of 2,900,000 and white 7000. In 1927 his condition was thoroughly investigated; the red cells were then 3,078,000, the white cells 4000, and the hæmoglobin content 63. There was notable anisocytosis with microcytes and macrocytes; there was also some anisochromia but poikilocytosis was scanty. Spectroscopic examination of the blood-serum did not reveal the presence of hæmoglobin; van den Bergh's reaction was positive indirect, negative direct. The urine was, as a rule, clear, with short periods when it was wine red and turbid. Microscopic examination of the sediment of the clear urine showed renal cells containing granular matter and casts with infiltration of the same kind. This infiltration gave a blue colour with ferrocyanide of potassium, showing the presence of iron. There were no red cells in this sediment. At the periods in which the urine became coffee-coloured the sediment had the same characteristics as those of hæmoglobinuria with hæmoglobin casts, which, however, did not give the iron reaction. The condition of the patient continued to deteriorate, and in July, 1928, the red cells numbered 1,968,000, the white cells 3000, and there was marked anisocytosis, polynuclear leucopenia, and lymphocytosis. The number of red cells having fallen further to 1,600,000, splenectomy was performed. After two infusions the condition improved but the hæmosiderinuria persisted, and after a three months' interval febrile symptoms set in and ended in the patient's death. At the autopsy there was no trace of siderosis in the liver; the kidneys were large, and showed the presence of iron only in the convoluted tubes; the other organs were free from it, including the spleen.

The ætiology of the disease remains obscure. Of its hæmolytic nature, on the other hand, there is no doubt, as is shown by the continuous elimination through the kidneys of the colouring matter of the blood transformed into hæmosiderin, and by the recurrent hæmoglobinuria. This transformation into one of the hæmosiderinic group, giving an iron reaction, occurs through the operation of living cellular organisms—i.e., the epithelium of the secreting portions of the kidneys. That the spleen could have in this case an abormal destructive function, either within its own parenchyma, or in the circulating blood, as happens invariably in other forms of hæmolytic anæmia, is excluded not so much

[1] Policlinico, Medical Section, xxxviii., March 1st, p. 105.

by the absence of any trace of hæmosiderosis in it as by the failure of any beneficial effect from its ablation. As to the seat of the hæmolysis, it is not the spleen—for the foregoing reasons—nor the liver, nor the bone-marrow, nor the lymphatic glands, since it is impossible to imagine that globular destruction could take place in these organs without leaving the necessary residual changes. Hæmolysis in the circulating blood is not reconcilable with the absence of splenic enlargement, of siderosis in the liver, or of copious urobilinuria, and with the fact observed by Micheli that the amount of iron, which is increased in the urine, remains normal in the fæces. The red cell destruction must therefore take place in the vascular system of the kidneys, and occurs in two ways, one persistent and slow by the transformation of the hæmoglobin into hæmosiderin in the protoplasm of the renal epithelium, the other rapid and violent, whence the recurrent hæmoglobinuric crises. The disease, of which the case described is an example, is a form of anæmia of a special type which is easily distinguishable from all other forms—i.e., hæmolytic splenomegaly, pernicious anæmia, and the various forms of hæmoglobinuria. Micheli proposes to give to this disease the name of "hæmolytic anæmia with hæmoglobinuria and hæmosidinuria." But considering that the hæmoglobinuria shows itself only by crises at variable intervals and sometimes as in the first case described by Nazari once only in the long course of the disease, and considering that on the contrary the hæmosiderinuria is constant and persistent up to the day of death, it appears that the greater importance is attached to this, and that the proper appellation should be hæmolytic anæmia with persistent hæmosiderinuria.

FACTORS IN SEXUAL IMPOTENCE

THE sexual neurotic is unhappy not only because of his disability but because he is generally in despair of finding anyone who is prepared or able to help him. As Mr. Townley Clarkson pointed out last Friday at a meeting of the Society for the Study of Venereal Disease, impotence lies in the no-man's land of ailments between the neighbouring claims of the genito-urinary surgeon and the neurologist. The surgeon, as a rule, has little time for what he too frequently regards as a minor ailment, whilst the neurologist, skilled though he be in the treatment of functional disorders, has little expert knowledge of the organic lesions that may attack the organs of sex. Mr. Kenneth Walker, in his opening paper at the same meeting, laid stress on the psychological factors in the causation of impotence. Even when an organic lesion is found it is more likely than not that this has served only as a nucleus around which a functional trouble has formed. This indeed is the manner in which many other functional disorders arise, and although the elimination of the original lesion may be part of the treatment, a cure will not be effected unless the psychological difficulties to which the lesion has given rise are got rid of. It was, he pointed out, a matter of considerable difficulty to interpret the exact significance of the changes which were found in the genital tract of sufferers from primary impotence. These changes were well recognised by genito-urinary surgeons, and consisted of a swelling and tenderness of the prostate, and particularly of that portion of it known to anatomists as the verumontanum. Sometimes, when the trouble had been preceded by a prostatitis, these changes were definitely the cause of the impotence, but more often than not no history of infection could be obtained, and the changes in his opinion must be considered secondary rather than primary. Functional disorders were often associated with an upset in vaso-motor control, and the swollen and hyperæsthetic verumontanum of impotence was a phenomenon similar in nature to the *tache cérébrale* of hysteria. But while laying emphasis on the psychological factors in the causation of primary impotence, the physical investigation of the genitalia was, in Mr. Walker's opinion, of the very greatest importance, not only because of the necessity of discovering any organic lesion that might be present, but because it was only by being thorough that the patient's confidence could be gained.

THE NEGATIVE PHASE IN ANTIDIPHTHERIAL IMMUNISATION.

Dr. Richard Prigge [1] has been carrying out investigations in the State Institute for Experimental Therapeutics at Frankfurt a.M. to determine whether active immunisation of guinea-pigs against diphtheria produces a so-called "negative phase" or increased susceptibility to the disease. He found that guinea-pigs which had been immunised against diphtheria toxin or living diphtheria bacilli did not show any increased susceptibility to diphtheria toxin before immunity was obtained, nor any increased susceptibility to infection by diphtheria bacilli provided that the doses of the vaccine were not too high. Increased susceptibility was only produced when a large overdose of the vaccine had been used. He was unable to decide whether a negative phase in the ordinary sense of the term had taken place in this experimental intentional overdosage which is not likely to occur in the human subject, or whether the symptoms were merely the result of an excessively large dose of vaccine. In human inoculation of diphtheria toxin the dose employed is 1 to 200 times smaller than that used in experiments on animals without causing an increase in susceptibility. The experiments strongly suggest that the development of increased susceptibility, or of the so-called negative phase, can be excluded in human inoculation against diphtheria.

TESTICULAR GRAFTS ON RAMS.

THE somewhat extravagant claims made by grafting enthusiasts have induced two Australian veterinary surgeons, Mr. R. M. C. Gunn and Mr. H. R. Seddon, to repeat the experiments carried out by Voronoff and record their results.[2] The rams used were divided into three groups. In the first group the object was to determine the fact of testicular tissue being viable after being grafted for varying periods into the scrotum of young male rams. The second group was employed to determine whether increased production and hastened maturity could be obtained by means of the testicular grafts, and the third to determine whether old senile sterile rams could be reinvigorated and rejuvenated. The operative technique employed was that which Voronoff has made familiar. The conclusions arrived at were as follows: (1) Normal living, but not growing, testicular and epididymal tissue can be recovered as long as 24 days after grafting merino rams. (2) Absorption of testicular tissue grafted on the parietal tunica vaginalis of the scrotum appears to be rapid, usually occurring in young rams within one year. (3) There is no good evidence of any beneficial influence on body-

[1] Med. Klinik, March 20th, p. 419.
[2] Austral. Vet. Jour., Sept. and Dec., 1930

weight or wool-production as a result of testicular grafting or of injections of pulped testis or saline extract of testis. The operations were done with a proper use of control animals and in a critical attitude of mind. Whilst the results seem to establish Voronoff's contention that grafts implanted by the method he recommends are viable, they clearly indicate that they do not live so long as he supposed. Gunn and Seddon point out that any beneficial effect produced by the absorption of grafts can be of very little importance since the storage capacity of testicular tissue is infinitesimal. Apparently, therefore, testicular grafting is not likely to be of much use either in human or in veterinary practice. In any case its high cost would limit its utility in the stock-breeding yard.

TRACHOMA IN POLAND

AMONG the general population of Poland the incidence of trachoma is estimated at about 1 to 1·5 per cent. It had a great stimulus after the war when about 3,000,000 refugees were repatriated from Russia. In 1919 compulsory notification was enacted and the numbers notified rose continuously between 1920 and 1929. The measures taken to combat the scourge are told by Dr. M. Zachert, chief of the anti-trachoma service.[1] Special dispensaries, hospitals, and mobile units have been founded and the number of cases treated in 1929 at these institutions was over 35,000. Periodical examinations are made in the schools and among recruits, children's refuges, and orphanages. Thirteen special hospitals for trachomatous children have been founded, each hospital having a school so that the children's education can be carried on uninterruptedly just as it is at Swanley. The results obtained in these hospitals have been distinctly good. Out of 6640 children admitted in ten years 5157 have been cured. Whereas in 1924 the percentage of trachomatous children in the orphanages was 13 per cent., in 1929 it was reduced to 5 per cent. We are not told in what the routine treatment producing this result consisted. Besides the hospitals for children there were in 1929 260 dispensaries treating over 31,000 trachomatous patients and two mobile hospitals in which operations were performed. An important part of the campaign is the holding of special trachoma classes for doctors at the State School of Hygiene, the number of doctors having attended these courses being 220. The whole campaign is financed by the State, the amount allocated to it in the budget of 1929 being a million and a half French francs.

PLANKTON AND BACTERIA IN SEWAGE.

THE rôle of bacteria in the purification of sewage has been recognised for the last 40 years, and it is well known that the bacterial flora of an effluent is, under suitable conditions, an efficient oxidising agent. The less numerous but nevertheless large population of infusoria or protozoa always found in sewage and polluted waters has been less carefully studied, although the presence of such organisms has been recognised as collateral evidence of pollution. In the sea the drift of this vast population of feebly motile organisms, conveniently known as plankton, determines the movements of the fish which feed on it, for the plankton is to the sea what the grass is to the land. The United States Public Health Service has been conducting researches on the more intimate mechanism of sewage pollution, and in a recent report[1] C. T. Butterfield, W. C. Purdy, and E. J. Theriault have described the influence of typical plankton on the biochemical oxidation of organic matter. Having prepared dilute dextrose-peptone solutions which could be readily and accurately reproduced, and which could be kept, when sterile, for long periods without absorbing the oxygen of the air dissolved in them, they studied the effect of inoculation with various bacteria. These in all cases multiplied rapidly and absorbed oxygen until in about two days a limit of both bacterial population and oxygen absorption was reached, this state being sooner and more definite with pure culture than with mixed organisms. A technique having been devised whereby colpidium, a small paramœcium-like organism, could be washed and kept free from bacteria, cultures of this were introduced into the dilute (5 mg. per litre) and sterile dextrose-peptone medium in which they did not multiply, although they throve fairly well in a medium a hundred times the strength, showing that a certain concentration of food was necessary if they were to be kept alive on a slop diet. When introduced into solutions seeded with bacteria the result was very different. The bacteria increased as before, but as the protozoa also increased their numbers fell off to a fairly steady figure and both kinds of organisms lived together, oxygen absorption going on steadily as it does in naturally polluted water. It seems therefore that in this, as in similar cases among the higher animals, a balance of vegetable and animal life, of food collectors and food consumers, is reached. The only stable communities are complex ones, the predatory members of which, by taking their toll of the others, enable them in the mass to live successfully and to fulfil their natural functions, which in this case, from an economic standpoint, is the collection of putrescent colloid and other matter for oxidation. Protozoa, it would therefore seem, are useful members of biological filters, and their presence is vitally necessary in activated sludge.

[1] Bull. Off. Int. d'Hyg. Publ., March, 1931.

[1] U.S. Treasury Dept. Public Health Reports, 1931, xlvi., 393–426.

THE GROWTH OF VISUAL PERCEPTION IN CHILDREN.

IT has been frequently suggested both by physiologists and psychologists that perception is subject to laws of its own; that, in fact, these are very elementary compared with the appreciations of the external world in which fully fledged intelligence is in operation. The work of the Spearman school, which has given an impulse and new direction to the mathematical assessment of general intelligence (or rather the function "g"), has led to the exploration of the whole process of cognition by means of graduated test material. With this guiding principle of method in the forefront of the investigator's mind, the special abilities in man were investigated separately and correlated with such particular functions as imagination, and with the processes involved in practice, fatigue, and perseveration. It is inherent in the Spearman theory that perceptual experience which falls within the laws of cognition should also be obedient to the same laws of the mind, as the higher processes of cognition—that is, the eduction of relations and the eduction of correlates.

Prof. W. Line,[2] working in the school of Spearman, has come to the conclusion, from carefully calibrated tests, that it is futile to use separate tests for perceptual

[2] Monograph Supplement XV., Brit. Jour. of Psychol., 1931, 12*s.* 6*d.*

experience and that dichotomy of thought and perception is not acute, but one of degree only, and that quantitatively and qualitatively the same laws of cognition are in operation. It is necessary, in the interest of clarity, to pause and consider what this discovery means, for it brings into the discussion the much debated theory of perception for which we are indebted to Kohler, Koffka, and Wertheimer, the so-called Gestalt or configuration theory of perception, and its relation to the apparently divergent theory of relational perception which is the outcome of the Spearman school to which Line enthusiastically belongs. In fact, Line has, from his carefully planned research, shown what he believes to be the truth of Spearman's laws of cognition as applied to visual perception. He stresses the distinction, however, between primary and secondary perception. The first includes the bare apprehension of a percept and the eduction of relations, while the second embraces supplementation due to past experience, together with supplementation which is due to the eduction of correlates. In his researches he discovers that "the growth in the capacity to perceive similarities of 'form' appears to take place in a manner directly parallel to the development of 'g,' at least, the two powers are highly correlated." His results point to what he calls a multistratal growth—an increase in the capacity to perceive relations in all levels simultaneously. In arranging his investigation he chose for his test material spacial diagrams, with and without meaning, pictures with meaning, three-dimensional models, and cinematographic representations. He draws the conclusion that in the appreciation of relations we have "the very woof and warp of shapes or whole qualities. The elementary relations of the lowest levels in themselves form fundaments for relations of the highest order."

Prof. Spearman believes that Prof. Line has given a new orientation to the subject of mental testing, and believes that the light that this investigation throws upon perceptual growth must lead to the discarding of many established tests. The fact remains, however, that the fundamental concept of relations belongs to epistimological studies rather than to the domain of experimental psychology—that is, do relations as such exist in the mind independent of the terms which they bind together? The speculation, however, does nothing to detract from Prof. Line's thorough and stimulating inquiry.

THE PATHOGENESIS OF PINK DISEASE.

IN spite of the interest which pink disease has attracted since the publication of Swift in 1914, and of Feer in the early post-war years, the real nature of this disorder remains undecided. Though much work has been done on the morbid anatomy, the findings of different observers have varied so much that no single lesion has been established as essential. The morbid changes in peripheral nerves and anterior horn cells found in some cases have been absent in others, and their underlying cause is still obscure. Hypotheses to account for the condition have been based on clinical analogies rather than positive evidence. Of these hypotheses, one which was in some favour a few years ago, especially in America, arose from the resemblance borne by pink disease to pellagra, from which it was inferred that it was a manifestation of avitaminosis. Latterly this view has somewhat lost ground, because of the number of cases reported in which vitamin deficiency could be excluded. There remain as alternatives those old favourites, the alimentary toxæmia, absorption from septic foci, and systemic infection, and for none of these has the case yet been proved.

The view that pink disease is infective is strongly supported by M. Péhu and A. Mestrallet.[1] They have previously sought to establish its nosological identity with the epidemic "acrodynia" of 1828 and they now bring forward further arguments in favour of its being a specific infection of the nervous system closely analogous to encephalitis. The cases, they say, show signs of grouping into certain localities, and some of the psychic disturbances, notably the intractable insomnia, bear out the analogy. From the standpoint of morbid histology further arguments are adduced. They give a full summary of two published necropsies (Francioni and Vigi, Kernohan and Kennedy) and compare them with the findings of Paterson and Greenfield, Byfield, and others. In the first case the most significant observations were degenerative changes in the cells of certain mesencephalic ganglia; Francioni and Vigi also found cellular infiltration in the region of the cervical sympathetic ganglia, of the nature of perivascular cuffing. The changes found by Kernohan and Kennedy were more diffuse; there were signs of degeneration and demyelination (but not inflammation) in some peripheral nerves, especially the sciatic, and some chromatolysis in the posterior root ganglia; chromatolysis was seen to the greatest extent in the cells of the mesencephalic ganglia. A point on which all the observers quoted are in agreement is that the cells of the hemispheres and cerebellum are unaffected, though Warthin found a condition of meningeal œdema.

Péhu and Mestrallet think the evidence they have collected justifies the classification of acrodynia as an infective disease closely allied to encephalitis, probably caused by a neurotropic virus which produces diffuse lesions but shows a predilection for the mesencephalic centres of the autonomic system.

STREPTOCOCCAL VARIATION.

IT was Prof. H. Schottmüller, of Hamburg, who first classified the streptococci according to their action on red blood corpuscles incorporated in the culture media on which they are grown. As is well known some of the streptococcal colonies show after incubation a clear area around them in which the red cells are completely hæmolysed, others show a green appearance due to partial hæmolysis, and yet a third group appears to have no action on the red corpuscles in the culture material—the groups being named respectively as hæmolytic, green (*viridans*), and non-hæmolytic. How closely this grouping bears on the ability of the organism to produce disease in man is apparent from much recent work—witness the Guy's Hospital study on which we commented three weeks ago.[2] Schottmüller and his pupils have, however, now brought forward evidence[3] to show that while truly hæmolytic and green streptococci keep their characteristic appearances on subculture, a degradation of the hæmolytic streptococci into the appearance of *S. viridans* may under certain conditions occur. Their results appeared in the course of experiments on the relation of the infecting hæmolytic streptococci to puerperal fever. Normally the uninjured female vagina does not contain hæmolytic

[1] Rev. de Méd., Jan., 1931, p. 1.
[2] THE LANCET, April 11th, p. 819.
[3] Klin. Woch., Jan. 17th, p. 107.

streptococci; these are introduced from without, as Semmelweis rightly surmised, and with the subsidence of the infection they disappear. Schottmüller and his fellow-workers have followed up this disappearance. They introduced hæmolytic streptococci, which had been incorporated in silk threads by placing the threads in virulent broth cultures and then drying them, into the vagina of healthy non-pregnant women and found that, on withdrawal after a few days and subculture, relatively few hæmolytic colonies were recovered but a correspondingly large number of green streptococci. Further a degradation of the hæmolytic streptococci occurred when the silk threads after drying between blotting-paper were left in sterile flasks; cultures made at varying times later showed that a dying-out of streptococci was accompanied by a diminution of the hæmolytic power of the remainder, and indeed by a loss of virulence to mice. The hæmolytic power and virulence could be rehabilitated when the streptococci were subcultured in fresh blood media or by passage through the bodies of laboratory animals such as mice. These results explain certain anomalies in the subculture of the hæmolytic group which have troubled bacteriologists. But there is no evidence that the true *S. viridans* can be made to take on hæmolytic powers. Its characters and pathogenicity bring it into a class by itself.

RADIOGRAPHY OF ABDOMINAL ARTERIES.

THE use of arteriography in cerebral conditions was briefly reviewed in our issue of Jan. 31st. (p. 249). A similar method of examining the abdominal aorta and its branches is now described and illustrated by Portuguese workers [1] and has been applied, it is stated, in more than 100 cases. The aorta is punctured posteriorly, an opaque fluid is rapidly introduced through the needle, and a radiogram is taken during the injection. To limit and concentrate the circulation of the fluid in the branches of the aorta, tourniquets are applied to the upper thighs. The solution originally used was one of sodium iodide in high concentration, but this caused somewhat severe pain when it reached the smaller arteries and arterioles. The substance called abrodil, which is now employed instead, is an organic compound of iodine which is commonly used in urography. Twenty grammes are injected and it is said to prove relatively non-toxic, giving a good opaque shadow, and causing less pain than sodium iodide. It would be interesting to know whether the new Japanese substance named l'ombre would be even more satisfactory. As a preliminary the splanchnic nerves are anæsthetised by injection of novocain around the area in front of the twelfth dorsal and first lumbar vertebræ. The needle is inserted to a depth of 10 to 11 cm. from a point four fingers-breadth to the left of the mid-line posteriorly under the twelfth rib towards the vertebral bodies. After a short pause it is pushed in a further 1–2 cm. and pierces the abdominal aorta. The abrodil solution is then quickly injected by a special apparatus under a standard pressure and the films are taken at this moment. Stereoscopic photographs can be made and in this way the interpretation is made easier. In this technique the authors claim to have evolved a simple, certain, and harmless method of great value in diagnosis, because it shows the blood-vessels of the abdominal viscera. Since the abrodil is excreted by the kidneys it is, moreover, possible to secure radiograms of the urinary tract during the 10 or 20 minutes following the injection. The photographs reproduced certainly give a clear picture of the abdominal blood-vessels, and the method is likely to give important information about the anatomy and perhaps the physiology of the abdomen. Its value in the diagnosis of disease also seems to be considerable, though at present the technique is hardly perfect enough to warrant its general use. Its originators are to be congratulated, however, on their ingenuity and achievement.

[1] Santos, R. dos, Lamas, C., and Caldas, P.: Presse Méd., April 18th, p. 574.

WE regret to announce the death on April 27th of Sir Byrom Bramwell, consulting physician to Edinburgh Royal Infirmary and sometime President of the Royal College of Physicians of Edinburgh. He was in his eighty-fourth year.

THE SERVICES

ROYAL NAVAL MEDICAL SERVICE.

THE following appts. are made:—Surg. Comr. F. G. Hitch to *Victory*, for Haslar Hospital; Surg. Lt.-Comr. E. J. K. Weeks to *President*, for post-graduate course, and to *Tamar*.

ROYAL ARMY MEDICAL CORPS.

Lt.-Col. M. B. H. Ritchie retires on retd. pay.
Maj. (temp. Lt.-Col.) D. F. Mackenzie to be Lt.-Col., vice Lt.-Col. M. B. H. Ritchie.
Maj. and Bt. Lt.-Col. T. H. Scott to be temp. Lt.-Col.
Lt. W. F. Lane to be Capt.

ARMY DENTAL CORPS.

C. A. Pank to be Lt. (on prob.).

ARMY RESERVE OF OFFICERS.

Maj. J. E. H. Gatt having attained the age limit of liability to recall ceases to belong to the Res. of Offrs.

TERRITORIAL ARMY.

Capt. C. S. Atkin resigns his commn. and retains his rank, with permission to wear the prescribed uniform.
Capt. W. S. C. Copeman, from Active List, to be Capt.
J. S. Moore (late Surg. Sub.-Lt. R.N.V.R.) and D. Macleod to be Lts.
G. K. Thornton (late Lt., R.F.A. Spec. Res.) to be Lt.
H. R. Ferguson (late Offr. Cadet, Cambridge Univ. Contgt., Sen. Div., O.T.C.) to be Lt.
Supernumerary for Service with the O.T.C.—Lt. W. A. Mackey to be Capt.

ROYAL AIR FORCE.

Dental Branch.—Flying Officer A. P. Atkins is granted a non-permanent commission as a Flight Lieutenant.
Flight Lt. W. Wormington, Capt. A.D.C., relinquishes his temporary commission on return to Army duty.

ROYAL MEDICAL BENEVOLENT FUND.—During the first quarter of this year the sum of £3650 has been voted in grants to applicants, as against £2562 during the corresponding period of last year. Subscriptions received during the same period amounted in 1931 to £2499, but in 1930 to £2628. At the April meeting the committee voted £795 to 45 applicants.

One recipient was a widow aged 43 with a daughter aged 9 who called at the office of the Fund. Her husband qualified in 1914, joined the R.A.M.C. and served throughout the war. He was wounded at Ypres in 1915 and was four times mentioned in despatches. The latter part of his service was with the British Military Mission in Siberia. While there he married a Russian lady who was engaged in Red Cross work in Siberian Hospitals. After demobilisation he practised in the Far East from 1919 to 1930. As the result of an accident he died at the age of 42. The practice was sold, and it is expected that the estate will yield an income of £70 a year. The first dividend not being payable till June, the Fund has given a grant of £26 to the widow and arranged with another charity to give a similar sum to tide her over her present difficulty. The Royal Masonic Institution has undertaken the education of the child. Employment is urgently needed for the widow. She speaks English and French fluently as well as Russian.

Subscriptions and donations to the Fund should be addressed to the hon. treasurer at 11, Chandos-street, London, W. 1.

SPECIAL ARTICLES

IMMUNITY IN VIRUS DISEASES.*

BY C. H. ANDREWES, M.D., M.R.C.P. LOND.,
MEMBER OF THE SCIENTIFIC STAFF, NATIONAL INSTITUTE FOR MEDICAL RESEARCH, HAMPSTEAD.

I.

Two properties of viruses are probably particularly important. Firstly, on their small size depend the facts that they will mostly pass through candles or membranes impermeable to the majority of bacteria and that they can be seen or stained not at all or only with great difficulty and by the aid of special methods. Secondly, they are apparently intracellular parasites, and this is probably the reason why so little success has been encountered in attempts to cultivate them on cell-free media; upon this property, too, doubtless depends the existence in many virus diseases of the remarkable intranuclear or cytoplasmic "inclusion bodies" which I shall refer to later. The immunological properties of viruses are probably related to both the above properties—small size and intracellular parasitism.

Duration of the Immunity.

The study of immunity to viruses is rather a hopeful one because in the field of active immunisation against viruses there are some striking successes which greatly encourage workers at the present day. Such successes probably depend largely on the fact that so many virus diseases leave behind them a solid and lasting immunity. If you go through the list of known virus diseases carefully, you cannot, I think, help being struck by the large numbers of virus diseases which *are* followed by solid immunity. A few are invariably fatal and therefore cannot be considered in this connexion. Of the rest you will find four familiar ones—herpes simplex, the common cold, influenza (if you believe that to be a virus disease), and foot-and-mouth disease, in which the immunity is rather transient. But you will readily find a couple of dozen virus diseases in which the immunity is fairly durable; these include most of the specific fevers of childhood (see Table I.). Indeed,

TABLE I.—*Virus Diseases followed by—*

LASTING IMMUNITY.		TRANSIENT IMMUNITY.
Small-pox.	Poliomyelitis.	Common cold.
Measles.	Yellow fever.	Herpes simplex.
Mumps.	Cattle plague.	Foot-and-mouth disease.
Chicken-pox.	Swine fever.	Influenza (?)
Herpes zoster.	Dog distemper.	
&c.	&c. &c.	

the specific fevers are classed together partly because they are diseases of childhood which do not tend to recur. Adults infrequently get chicken-pox or poliomyelitis probably because they have had either the disease or a "subclinical infection"; adults in isolated communities such as the Faeroe Islands who have never been exposed to measles prove just as susceptible as children when they do come into contact with the infection.

The bacterial diseases whose symptoms are definitely associated with a toxin—e.g., diphtheria—leave behind a good immunity, but if I were to ask you to name others which do so you would say at once "typhoid fever," and then scratch your head and begin to think.

* Two lectures (abridged), delivered at University College Hospital Medical School on March 17th and 24th, 1931.

It is obviously nonsense to say that this question of solid or transient immunity will avail to demarcate virus diseases from bacterial ones; it is equally absurd to deny that viruses (and, we may add, toxins) have a stronger tendency than bacteria towards the production of a lasting immunity. Let us consider to what this lasting immunity can be due; three possible factors must be dealt with.

(1) CONSTANT REINFORCEMENT OF IMMUNITY.

Firstly, it is probable that immunity to any organism will last much longer if the immune person is constantly exposed to the infecting agent, so that the immunity following an attack of the disease is constantly being reinforced by little doses, too small to overwhelm his defences and give him a fresh attack. There is evidence that this is so as regards maintaining immunity to diphtheria and typhoid fever. It is very likely true with virus diseases also. With a virus like that of the common cold which leaves behind only a transient immunity such a mechanism probably plays a part. Witness the colds which immediately affect Arctic explorers as soon as they return to civilisation. But it does not follow that this reinforcement of immunity is essential in virus diseases. People who have had yellow fever in the tropics many years ago and have then gone to live in countries where the disease does not exist may be found, years and years afterwards, to have good neutralising antibodies in their serum.

(2) PERSISTENCE OF VIRUS IN IMMUNE HOST.

Secondly, it has been suggested that immunity to a virus may be associated with persistence of that virus in the immune animal; the same sort of thing is known to occur, of course, in syphilis. If viruses do so, it is presumably in some remote hiding place in the body, for convalescents from specific fevers due to viruses are not commonly a source of infection to others. It is possible, however, for vaccinia to persist in an inoculated rabbit for many weeks in spite of the presence of potent antibodies in the animal's body fluids, and for fowl-pox virus to remain even longer in the tissues of a recovered bird. An instructive example is afforded by the submaxillary virus of guinea-pigs. This virus occurs in the salivary glands of almost all adult guinea-pigs of certain stocks. Such adult guinea-pigs are immune to the effects of this virus introduced elsewhere into their bodies. But very young guinea-pigs, which do not harbour the virus in their salivary glands, will die of acute meningitis if the virus is inoculated into them intracerebrally, or they will develop an acute local lesion if it is injected into them at any other site. How the virus manages to persist at one site—in the salivary glands—of the immune adult guinea-pigs is a mystery.

A still more striking example is afforded by the infectious anæmia of horses. Here the blood of horses which have apparently recovered from the disease is found to be virulent when injected into other horses—for as long sometimes as 14 years afterwards. The horses carrying the virus thus are not, however, really immune as they may have a relapse at any time.

The idea that a virus may be latent in an immune or insusceptible host is a familiar one to workers with viruses infecting plants. Certain races of potato are immune from the attack of a certain kind of potato-mosaic virus, but when grafting experiments

are carried out from such an immune race to a susceptible variety of potato, the susceptible race becomes infected and it thus becomes clear that the immune sort is a carrier of the virus, which must live in its tissues without causing any harm. I do not propose to discuss whether or not bacteriophage is a virus, but it certainly behaves like one in many respects; here again it appears that an organism like *B. coli* may permanently "carry" a phage which does not affect it, but can cause lysis of another organism, the dysentery bacillus. I am not suggesting that there is any certainty that this sort of thing is a usual occurrence with animal viruses; but the possibility is very well worth while bearing in mind.

(3) NATURE OF THE HUMORAL IMMUNITY.

The third factor which may help to explain the persistent immunity to viruses lies in the nature of the humoral immunity. In suggesting that this is somewhat different from humoral immunity to bacteria, I do not mean to imply that the body's response is necessarily different in the two cases; only that the antibody which develops may be effective in a rather different way. Bacteria sensitised or coated by antibody are not, by that alone, killed or prevented from multiplying; only when phagocytes come to engulf or destroy them or complement to lyse them are they put out of action. But it seems likely that a small body such as a virus when it unites with antibody may have its physical properties so altered that it cannot attack and enter the susceptible cell; the antibody has effectively neutralised it as an antitoxin does a toxin, directly, without the necessity of calling in complement or leucocytes to help it. This mode of neutralisation may well be more effective than the more cumbrous mechanism which has to be used against bacteria. As a rough generalisation it seems true that a purely humoral mechanism is most effective against the smallest noxious agents. It is very effective against toxins and viruses; less so against bacteria; still less so against larger things such as protozoa and worms.

It is possible passively to immunise animals against many virus-diseases with immune sera. These sera may be quite ridiculously effective; apparently one-tenth of 1 c.cm. of immune serum will suffice to confer upon a monkey a passive immunity which will protect it from infection with yellow fever virus. Extremely small quantities of serum will also passively protect against measles and dog distemper.

A number of experiments reveal that the inactivation of a virus by immune serum is not a perfectly simple business. One cannot simply say that the antibody unites with the virus and destroys it. On the contrary, one can inactivate a virus with immune serum and then restore its activity again. One can make a mixture of vaccinia virus with immune serum and have so much immune serum present that the mixture inoculated into a rabbit's skin in a dose of one-tenth of 1 c.cm. produces no lesion; one then dilutes the mixture ten or a hundred times and inoculates one-tenth of 1 c.cm. of that into the rabbit; though the rabbit receives only one-hundredth of the original dose of virus a lesion will commonly result; dilution has reactivated the neutral mixture. This phenomenon can be demonstrated with a number of viruses including fowl-plague, vaccinia, herpes, and poliomyelitis. This experiment along with others at one time led me to doubt whether virus and antibody united at all in the test-tube and to wonder whether the union might perhaps only occur in the body. This suggestion, however, is not a valid one; for if virus and serum are kept in contact for a long time in vitro it will no longer be possible to reactivate the mixture by dilution; a firm irreversible union has apparently occurred. This only takes place after some days in the case of vaccinia; with other viruses the firm union probably occurs after a few hours. This reactivation of a neutral mixture by dilution has a close parallel in experiments with toxins and antitoxins; neutral mixtures of tetanus, diphtheria, and botulinus toxins with their appropriate antisera can be rendered toxic again by dilution; but here again it is only possible when the mixtures have not been left standing for too long beforehand. It is supposed in this instance that the toxin-antitoxin union is at first loose and can be dissociated by dilution, but becomes firm and irreversible later; and it is extremely probable, though not yet proved, that the same is true of a virus-antibody combination. If it turns out that an immediate loose union of virus and antibody occurs, it is important to realise that this loose binding is most often quite effective in stopping the action of the virus; the later irreversible reaction (if you like, the actual killing of the virus) is an added luxury. For experiments which I shall refer to later make it clear that a virus can attack a susceptible cell very rapidly (within a few minutes) and that immune serum can exert its protective action immediately—long before the virus-antibody union could have gone on to the irreversible stage.

Part Played by Complement and Leucocytes.

I stated that the immune sera could apparently neutralise a virus without the help of complement or leucocytes. It is difficult to be absolutely certain of this because one's ordinary test for neutralisation is to inoculate a serum-virus mixture into an animal, and although that mixture may contain no complement or leucocytes, yet these may, of course, be supplied as soon as the mixture gets inside the animal. Nevertheless, a good deal of indirect evidence suggests that they are not necessary. One can study the neutralisation by immune serum in tissue cultures. In vivo the virus of herpes simplex produces in cells of the rabbit's testis, both in cells of the parenchyma and interstitial tissues, oxyphilic intranuclear inclusion bodies. One can cultivate herpes in tissue cultures of rabbit testis in dilute rabbit serum. A very primitive technique will serve—one in which the tissue cells do not multiply, but merely survive for a few days. In such cultures there develop in the nuclei of the cells inclusion bodies exactly like those which the herpes virus forms in the living animal; one can look for these inclusions in stained sections of pieces of tissue from the cultures and thus tell whether or not the virus has grown, without recourse to any further animal experiment. Immune serum will protect the cells in such a culture so that no inclusions will develop and the virus will die out. One can be quite sure that leucocytes play no part in the inactivation of virus in such an experiment; the leucocytes present are scanty and immobile. One can be reasonably sure also that complement plays no part; for one can use washed cells, inactivated serum, and a virus which has been stored for some time.

It is, of course, conceivable that these neutralising antibodies react with some toxin or aggressin secreted by the virus and not with the virus itself. If that were so there would be no real difference between the inactivation of a virus and of a bacterium. But until such toxin or aggressin is demonstrated, economy of hypothesis makes us regard the antibody as reacting with the virus itself.

Serological Reactions other than Neutralisation.

Neutralisation of the virus is not the only property demonstrable in these immune sera. Complement-fixation reactions have been shown to occur by workers with the viruses of vaccinia, herpes, yellow fever, foot-and-mouth disease, dog distemper, and other viruses. Against vaccinia, further, a flocculation reaction has actually been used in the field as a method of diagnosis. Crusts of the lesions from cases of suspected small-pox are put up against a vaccinia-immune serum; a positive flocculation reaction suggests small-pox, a negative one chicken-pox or other disease as the diagnosis. But, just as with the corresponding reactions in bacterial diseases, we do not know what part, if any, those test-tube phenomena actually play in the immunity of the animal; nor whether the antigen concerned in them is the virus itself; nor whether the antibodies are identical with or run parallel with the neutralising antibodies.

It is also clear that, even if immune serum can inactivate a virus without the help of leucocytes, yet leucocytes do play a part in destruction of virus. Possibly they clear up and destroy virus which is prevented by its union with the antibody from getting inside susceptible cells. Normal rabbit leucocytes have considerable power to destroy vaccinia virus, and this destruction is helped by a heat-labile constituent of normal serum. But immune serum contains a heat-stable constituent which is still more effective in helping forward this destruction. The analogy with the mechanism of destruction of bacteria by phagocytes is obvious.

Cellular Immunity.

It has been maintained that immunity to viruses is a very special thing depending particularly on the cells and owing very little to antibodies; furthermore, that each tissue of the body—brain, skin, cornea, and so on—can develop its own immunity more or less independently of the rest of the body. These views have not met with much support in this country. It has been argued in their favour that a man vaccinated against small-pox is still immune at a time when antibodies can no longer be demonstrated in his serum; similarly, antibodies cannot be demonstrated by ordinary methods in guinea-pigs which are immune to foot-and-mouth disease as a result of vaccination. Instead of denying the existence of neutralising antibodies under such conditions it would seem more reasonable to suppose that the test for immunity to these viruses is more delicate than the tests available for detecting antibodies. An interesting light is shed by the tissue-culture experiments referred to earlier; in them it was found that herpes virus would grow in normal rabbit testis with normal rabbit serum, but not in immune rabbit testis with immune rabbit serum. On analysing this result by means of further experiment, it was found that immune serum prevented the virus from growing in normal rabbit testis, but that the virus would grow perfectly well in a culture of testis from an immune rabbit in normal serum. The immune serum was the important factor—it did not matter so much whether the cells came from a normal or an immune animal. However, one must not take up too extreme an attitude; cellular immunity doubtless plays some part.

The virus diseases which are not followed by lasting immunity are of particular interest. Herpes simplex, for instance, can recur in one subject again and again. Seventy-five per cent. of normal people appear to have antibodies to herpes virus in their serum, and those who are subject to recurring herpes seem all to have powerful neutralising sera; why, then, does their herpes keep recurring? Rabbits develop as good an immunity to herpes as to vaccinia; why cannot man? Possibly man is as solidly immune, on paper, as he is to other viruses, but the herpes virus is able to circumvent in some way the humoral or other defence mechanisms which are quite efficient against other infections.

Failure of Immune Serum to Affect Intracellular Virus.

It seems probable that an immune serum cannot neutralise a virus which is intracellular. Could it do so, it would be hard to explain how viruses could persist at all in animals with antibodies in their sera; and many viruses undoubtedly can do this. Many viruses can attack cells very quickly indeed, certainly within half an hour. In those tissue-culture experiments with herpes one type of experiment brought out two important points—first, the speed with which virus can attack cells; secondly, the fact that the immune serum cannot inactivate virus which has run for shelter to the safe harbour of the inside of a cell. Herpes virus was added to a culture of normal cells and immune serum was added half an hour later. It was too late; the virus had had time to invade the cells and proceeded to go ahead and multiply and form the typical inclusion bodies in spite of the antibodies which were now bathing the outside of the cell. Control experiments showed that the virus could never gain a foothold in the cell if the antibody was on the spot in time. Experiments on the living animal show the same thing. Immune serum can be put intradermally into a rabbit's skin and the exact spot marked. Virus inoculated into that exact spot five minutes later can produce no lesion. But if the virus is introduced five minutes before the serum it *can* produce a lesion, though it is true that this will be much smaller than that in a control site where no immune serum is injected. Here, again, the virus gets to work very quickly; the serum has got to be there first to do much good.

This sort of experiment has an obvious bearing on the possibility of serum-therapy in virus infections. It confirms the familiar clinical experience that serum is very potent as a prophylactic in some virus infections, but of much less use as a curative measure. It does not follow, however, that serum can do no good in therapeusis if the virus has once got in and infected a patient; I have suggested that it is probably unable to save a *cell* which the virus has once attacked. It may benefit the *patient* by limiting the number of cells which can be attacked and so controlling the disease. It is in this way that immune serum given during the incubation period of measles probably succeeds in aborting the disease.

HOSPITAL ALMONERS.—The annual report of the Incorporated Institute of Hospital Almoners records the taking possession of new premises in Tavistock-square and that the move has resulted in a great increase of work. The roll of students doubled during the year, and the number of hospitals appointing certificated almoners is steadily increasing. Thirty-nine such appointments have been made and 23 certificates granted, and at the close of the year there were 123 students in training. Lord Moynihan has become President in succession to Lady Bradford, and the council has decided that students without academic qualifications must obtain a University Social Study certificate during their course of training. Selection and advisory committees are already at work in Leeds and Liverpool, and others have been formed at Birmingham and Newcastle. It is hoped to standardise training and fees throughout the country.

IRELAND.

(FROM OUR OWN CORRESPONDENT.)

A MIDWIVES BILL.

On the motion of Mr. R. Mulcahy, Minister for Local Government and Public Health, the Dáil last week gave a second reading to a Midwives Bill designed to amend the Irish Midwives Act, 1918. That Act, the Minister said, had helped to reduce the mortality due to childbirth very considerably, and the mortality for 1929 was the lowest in the records of the country—namely, 4·1 deaths per 1000 births. The average for the preceding ten years had been 4·88 per 1000. There were, however, certain loop-holes in the Act of 1918, which it was now intended to close. Under the Bill any unqualified person who attended a woman in childbirth, unless such person could satisfy the Court that such attention was given in case of sudden and urgent necessity, would be guilty of an offence. Several deputies, of whom three were dispensary medical officers, drew attention to the low salaries paid to midwives employed in the poor-law service. It was also pointed out that, with the abolition of the "handy-woman," steps must be taken to increase the number of qualified midwives in the country, or there would be a shortage of service.

"OPTICAL BENEFIT."

Serious objection was taken on behalf of the medical profession last year to the methods sanctioned by the National Health Insurance Commission in the Irish Free State for the administration of the "optical benefit." This benefit, for which certain approved societies made provision, supplied glasses to members who required them, and the glasses were given on the advice of opticians, without any medical examination of the recipient or medical prescription. It was pointed out to the Commission at the time that such a practice involved two dangers. The absence of medical examination of those who complained of defective eyesight rendered it likely that many grave diseases of the eye would be overlooked, and their symptoms cloaked until serious damage had been done. On the other hand, the opticians were not slow to boast that their status had received the recognition of a Department of State, and the public were misled into thinking that opticians were a qualified class. It is now recognised by the Commission that these objections had substance in them, and it has been arranged that in future glasses will be supplied only on the prescription of a recognised ophthalmic surgeon. Arrangements have been made by which the services of ophthalmic surgeons will be available in all parts of the country.

COUNTY MEDICAL OFFICERS OF HEALTH.

In the Dáil last week, in answer to a question, the Minister for Local Government and Public Health was able to announce that county medical officers of health had now been appointed in 17 out of 26 counties in the Irish Free State. These counties are Carlow, Cavan, Cork, Donegal, Galway, Kerry, Kildare, Limerick, Louth, Mayo, Meath, Monaghan, Offaly, Roscommon, West Meath, Wicklow, and Wexford. In addition, there are three assistant medical officers of health in Cork, two in Donegal, and one in Galway.

THE BRITISH MEDICAL ASSOCIATION AND DUBLIN.

The Leinster branch of the British Medical Association has already begun its preparations for the annual meeting of the Association which is to be held in Dublin in 1933. The branch council has the cordial support of the Minister for Local Government and Public Health and of the Executive Council of the Irish Free State. The municipality of Dublin, through its Lord Mayor, Mr. Alfred Byrne, has also promised support, and the Lord Mayor has kindly offered the hospitality of the Mansion House for the use of the committees engaged in the arrangements for the meeting. The Universities and the Royal Colleges are also coöperating cordially, and no doubt will be equally ready to offer the hospitality of their buildings and premises. On April 15th a preliminary meeting of the profession of the Province of Leinster, together with representatives of various public bodies and many prominent laymen, was held in the Royal College of Surgeons, Dublin, to take the first steps toward organisation. The President of the Leinster branch, Prof. T. G. Moorhead, who is also President of the Royal College of Surgeons, was in the chair, and sketched the outlines of the necessary organisation. After him the Lord Mayor of Dublin was the principal speaker.

MEDICINE AND THE LAW.

Use of Quinine by Midwife to Induce Labour.

The East Suffolk coroner lately held an inquest upon the death of a young married woman at Lowestoft. The jury found that the cause of death was hæmorrhage supervening upon the birth of her first child. The evidence, not disputed, was that a midwife had administered quinine to induce labour. She did this without medical supervision, using a prescription which a medical practitioner had employed in another case in which she had been engaged; he had told her that she could use the prescription at any time if she thought it necessary and that he regarded the treatment as absolutely safe. In answer to Dr. D. W. Boswell, the midwife admitted that it was not usual for the nurse to induce labour without consulting a doctor; she was not aware at the moment that she was giving the patient grs. 40 quinine; she had no idea of the amount. She did not realise at the time that she was breaking the rules of the Central Midwives Board. She admitted that Rule 19 forbade her administering medicine unless a note of it was put in the register; she had made no such entry in her register, but intended to do so later. The practitioner who had given the prescription stated that he had discussed with the midwife the safety of the method. When he told her she might use the prescription, he did not know that the rules forbade her giving anything but an aperient or ergot. In answer to the coroner he dealt with the amount of quinine which could safely be used. When using quinine in these circumstances he had known no case of post-partum hæmorrhage. Dr. Boswell, asked by the coroner, said it was recorded that quinine did occasionally produce serious hæmorrhage. In his summing-up to the jury, the coroner pointed out that there was not sufficient evidence to justify attributing the hæmorrhage to the administration of quinine. There was no question of a verdict of manslaughter, for the midwife had naturally believed and relied upon what a qualified doctor told her. The jury added to the verdict, already mentioned above, the rider that artificial induction of labour should only be produced under the strict supervision of a duly qualified medical practitioner. This opinion had already been expressed in his evidence

by Dr. Boswell who explained that the prescription was a recognised method used in hospitals, but under strict medical supervision.

Breach of its rules is a matter which can be left to the Central Midwives Board to deal with. The midwife whose conduct formed the subject of the inquiry gave her evidence with frankness; she had eight years' working experience; more than one practitioner testified to her ability, and the jury's verdict absolves her. Two general observations may perhaps be added. Midwives who observe a treatment successfully applied by a doctor to one patient should not assume too readily that they themselves can safely apply it to other patients without supervision; secondly, prescriptions are not meant to be circulated like library books, least of all when a breach of the Central Midwives Board's rules is involved.

PUBLIC HEALTH SERVICES

PAYMENT FOR ACCIDENT CASES AT HOSPITALS.

UNDER Section 36 (2) of the Road Traffic Act, 1930, where any payment is made in respect of the death of or bodily injury to any person arising out of the use of a motor vehicle on a road, a sum not exceeding £25 shall be paid to cover reasonable expenses at the hospital where treatment has been given, provided that no charge has been made. Mr. W. Taylor, chief public assistance officer to the Surrey County Council, points out that the numerous accident cases admitted to Surrey municipal hospitals fall into two classes: (*a*) those belonging to the county, and (*b*) those who have a fixed place of abode in some other county or county borough. He suggests that all assistance granted to class (*a*) should be "on loan" under the provisions of Section 49 of the Poor Law Act, 1930. Each case reported to him would be considered on its merits, and in cases of probable long duration it might be advisable to make a charge and not a claim on the authorised insurer. Class (*b*) cases he would deal with under Section 80 of the Poor Law Act, 1930, which provides that the county or county borough in which they have a fixed place of abode should reimburse the council in full in respect of treatment. Credit would be given for moneys recovered from the authorised insurer. Such an arrangement would be a mutual one with other counties and county boroughs.

The Surrey Council has decided to adopt the procedure suggested by Mr. Taylor for a period of six months.

UNSOUND FOOD GIVEN AWAY AS PRIZES.

AT a meeting of the Metropolitan Boroughs Standing Joint Committee it was reported that unsound chocolates had been given away as a prize for a winning ticket at a recent entertainment in Islington. As a result of a visit paid to the stall by officials of the local authority, several hundred boxes of chocolates were surrendered as unfit for food and subsequently removed for destruction. The Metropolitan Branch Council of the Society of M.O.H.'s believes that a considerable amount of food is distributed in this way; complaints of unwholesomeness have from time to time arisen, but as the goods are not exposed or deposited for sale, Section 47 of the Public Health (London) Act, 1891, does not apply. The health committee of the Stoke Newington Borough Council is asking the London County Council to promote legislation, by means of a clause in a General Powers Bill, requiring that food given away as prizes or by tradesmen as gifts should, if intended for human consumption, be regarded as food exposed for sale under the section of the Public Health Act above mentioned.

INFECTIOUS DISEASE

IN ENGLAND AND WALES DURING THE WEEK ENDED APRIL 18TH, 1931.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 163; scarlet fever, 1376; diphtheria, 880; enteric fever, 36; pneumonia, 1313; puerperal fever, 45; puerperal pyrexia, 122; cerebro-spinal fever, 83; acute poliomyelitis, 5; acute polio-encephalitis, 2; encephalitis lethargica, 21; dysentery, 6; ophthalmia neonatorum, 131. No case of cholera, plague, or typhus fever was notified during the week.

The number of cases in the Infectious Hospitals of the London County Council on April 21st–22nd was as follows: Small-pox, 208 under treatment, 8 under observation (last week 190 and 7 respectively); scarlet fever, 1234; diphtheria, 1568; enteric fever, 26; measles, 146; whooping-cough, 432; puerperal fever, 29 (plus 15 babies); encephalitis lethargica, 129; poliomyelitis, 2; "other diseases," 182. At St. Margaret's Hospital there were 19 babies (plus 8 mothers) with ophthalmia neonatorum.

Deaths.—In the aggregate of great towns, including London, there was no death from small-pox, 4 (1) from enteric fever, 55 (0) from measles, 4 (1) from scarlet fever, 34 (4) from whooping-cough, 35 (10) from diphtheria, 36 (7) from diarrhœa and enteritis under two years, and 110 (11) from influenza. The figures in parentheses are those for London itself.

The deaths from enteric fever occurred in Exeter, Nottingham, and Bradford. Eight deaths from meningococcal meningitis occurred in London, 4 under 1 year, 1 each from 1–2 years, 5–15, 15–25, and 25–35 years. Twelve fatal cases of measles were reported from Birmingham, 7 from Sunderland, 6 from Liverpool. Leeds reported 4 deaths from whooping-cough. Diphtheria claimed 9 victims at Liverpool, 4 at Birmingham. The 99 fatal cases of influenza outside London are scattered over 54 great towns: 9 were reported from Birmingham, 5 from Leeds, and 4 from Croydon.

The number of stillbirths notified during the week was 305 (corresponding to a rate of 42 per 1000 births), including 44 in London.

LANCASTER JOINT HOSPITAL DISTRICT.—Lancaster town council is applying to the Ministry of Health for a Provisional Order forming the boroughs of Lancaster and Morecambe and Heysham, and the urban district of Carnforth, into a united district to be called "The Lancaster and and District Joint Hospital District" for the provision, maintenance, and management, for the use of the inhabitants of the joint district, of hospitals for the reception of cases of infectious disease, including small-pox.

MIDDLESEX HOSPITAL.—The report for 1930 was adopted at a court of governors recently. The number of patients admitted during the year (471 beds) was 6751, and their average weekly cost £5 4*s.* 1*d.* The average stay was 22·49 days and the total cost of each patient was £16 14*s.* 4*d.* The number of new out-patients was 52,118, and the attendances, which numbered 234,869, showed a marked increase. With more beds opened and a larger out-patient department to maintain, the expenditure amounted to £129,967. The income, thanks chiefly to some large legacies, was £141,602, leaving a credit balance of £11,635. Prince Arthur of Connaught, who presided at the meeting, said that the reconstruction scheme is nearing completion, but that the money in hand is sufficient only to cover the cost of the framework, leaving approximately £245,000 to be found to finish the work.

CORRESPONDENCE

THE POST-GRADUATE HOSPITAL AND SCHOOL.

To the Editor of THE LANCET.

SIR,—In his letter last week "Simplicitas" states his case in a simple and restrained manner as befits his pseudonym. His doubts arise from the fact that the great object which the Ministry of Health has in view is to provide an efficient medical service under the National Health Insurance Act, and the doctors involved are those working under that Act. The Ministry is not primarily concerned with post-graduate education of the whole medical profession in the country and not at all with post-graduate education of the medical profession of the Empire. The proposals to provide a large post-graduate hospital on the lines of Vienna are far wider in their bearings than the actual needs of the Ministry.

Now it is quite obvious that the needs of the Ministry are urgent and as a considerable amount of time must elapse before a post-graduate hospital envisaged in the proposals which have been published can come into effect, it would be well if existing facilities were fully used. London is already well provided for as far as the Ministry is concerned. The Fellowship of Medicine would, I feel sure, be glad to coöperate, and at the West London Hospital every facility is already obtainable. Even now arrangements are being made with local national health insurance committees in several districts for their members to attend the West London, but the hospital practice is capable of being more widely used in this way.

I am, Sir, yours faithfully,

HENRY SIMSON,
Dean of the West London Hospital Post-Graduate College.

April 31st, 1931.

To the Editor of THE LANCET.

SIR,—It is, as "Simplicitas" says, "a splendid thing that a great post-graduate centre is to commence its activities in the metropolis," and it is to be hoped that the difficulties he mentions will not be formidable. In an English undergraduate school the student is taught new methods of diagnosis and treatment, and by the time he has finished his course he has had opportunities of practising them himself, having been shown how to do so under expert example and instruction. The same will apply to the post-graduate except that, having already learned what was taught in his day, he will be in the position of a senior undergraduate and will therefore be able forthwith to begin the study of new methods.

The difficulty which the English doctor finds in getting away is not insuperable; it will at any rate be easier for him to go to London than to Vienna. There are many post-graduate centres in Great Britain now. One is the Fellowship of Medicine. Last year considerably over 600 post-graduates took out the courses it offers; more than half of these came from Great Britain, most of them in general practice. As these figures are from one post-graduate centre only, the total number of practitioners in Great Britain taking post-graduate courses must have been large. They managed it somehow by getting a partner to do their work or by a locum tenens, just as others succeeded in obtaining a holiday.

I am, Sir, yours faithfully,

W. HALE-WHITE.

April 25th, 1931.

To the Editor of THE LANCET.

SIR,—"Simplicitas" lays stress upon the difficulties of practitioners leaving their practices in order to undergo a course of post-graduate instruction. These difficulties can be overcome by adopting such a system as the holiday locum scheme run by the panel committee in connexion with practitioners on the London panel. By this scheme groups of doctors, varying in number from four to eight, arrange to act as locums for each other during absence on holiday. Each doctor pays into a pool five guineas for each week he is away, and his patients are given the list of members of the group to choose from when needing attendance. Payment out of the pool is made on the case value system, each individual patient (not each attendance) counting as one unit. In the case of practitioners on the panel the clerical work is undertaken by the panel committee. It should surely not present insuperable difficulties to arrange similar groups among other members of the profession.

I am, Sir, yours faithfully,

C. LUTHER BATTESON,
Medical Secretary, Panel Committee for the County of London.

Russell-square, W.C., April 28th, 1931.

INCUBATION PERIOD IN EPIDEMIC CATARRHAL JAUNDICE.

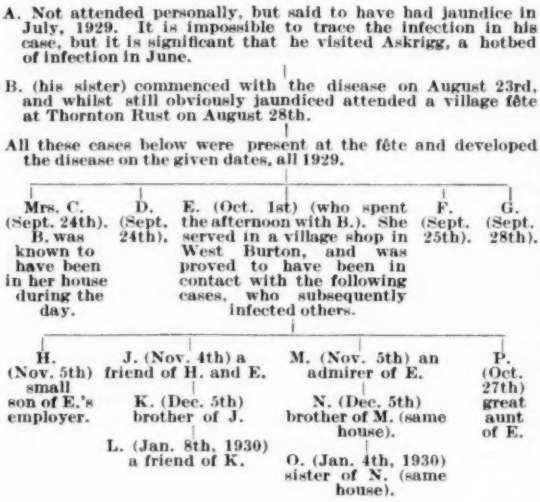
To the Editor of THE LANCET.

SIR,—I have read with great interest the account of an epidemic of catarrhal jaundice by Dr. J. Alison Glover and Dr. Joyce Wilson in your issue of March 28th (p. 722). There appears to be unanimity among recent writers as to its respiratory spread, but the above authors estimate the incubation period at about four days, a widely different view of the incubation period from that taken by Dr. W. G. Booth [1] and myself.[2] Personally I found it easier to track the course of infection when the cases were few than when, as in the larger villages, great numbers of cases occurred. Surely a scattered country district gives a better opportunity of arriving at an incubation period than a school in which the cases come thick and fast, and it is impossible to say which case infected which.

I do not presume to explain the incidence of the cases in the later epidemic, beyond pointing out that the hiatus recorded in the authors' diagram from June 9th to July 13th, and also the case of the "little girl who developed icterus 20 days after leaving the town," suggest a long incubation period. But I should like to repeat in full the following striking sequence, which was outlined in my own paper, and which is strong evidence in favour of an incubation period of about a month. This is only one of several chains which occurred in the Wensleydale epidemic,

[1] Public Health, May, 1928.
[2] Brit. Med. Jour., 1930, i., 944.

and which all support the claim of an incubation period of the same duration.


A. Not attended personally, but said to have had jaundice in July, 1929. It is impossible to trace the infection in his case, but it is significant that he visited Askrigg, a hotbed of infection in June.
B. (his sister) commenced with the disease on August 23rd, and whilst still obviously jaundiced attended a village fête at Thornton Rust on August 28th.
All these cases below were present at the fête and developed the disease on the given dates, all 1929.
Mrs. C. (Sept. 24th). B. was known to have been in her house during the day.
D. (Sept. 24th).
E. (Oct. 1st) (who spent the afternoon with B.). She served in a village shop in West Burton, and was proved to have been in contact with the following cases, who subsequently infected others.
F. (Sept. 25th).
G. (Sept. 28th).
H. (Nov. 5th) small son of E.'s employer.
J. (Nov. 4th) a friend of H. and E.
K. (Dec. 5th) brother of J.
L. (Jan. 8th, 1930) a friend of K.
M. (Nov. 5th) an admirer of E.
N. (Dec. 5th) brother of M. (same house).
O. (Jan. 4th, 1930) sister of N. (same house).
P. (Oct. 27th) great aunt of E.

These cases are the only ones which occurred in West Burton throughout the whole epidemic.

I am, Sir, yours faithfully,

W. N. PICKLES.

Aysgarth, Yorkshire, April 25th, 1931.

TREATMENT OF FUNCTIONAL ANOREXIA.

To the Editor of THE LANCET.

SIR,—It would be a pity to allow the paper in your last issue by Dr. Allison and Dr. Davies to go unremarked; for it places an emphasis that seems to me unfortunate upon the dietetic and medicinal treatment of an important condition. Anorexia nervosa as originally described by Gull cannot be so rare as they suggest; since T. A. Ross and R. Hutchison first interested me in it I have seen two or three cases each year, without going out of my way to look for them. It is often confused with mere loss of appetite in other conditions such as mental depression, but anorexia nervosa in the classical sense presents a clinical picture which is simply unmistakable, and in most cases curable as far as the symptoms are concerned, not by elaborate dietary, but by simple insistence on a sufficient intake of food. The patients are nearly always young women (I have not yet seen the symptoms in pure culture in a man) and unmarried. They complain (if you ask them, for they are usually brought by their relatives) of lack of appetite and amenorrhœa but of nothing else; and they are more or less emaciated but show no sign of organic disease. They are usually leading, if permitted, an ordinary life with apparent cheerfulness and apparently normal mentality in spite of a minimal intake of food which may ultimately reach vanishing point. Commonly they are at loggerheads with their family on the question of their nutrition.

Treatment consists essentially in removal from their family and isolation from visits and from correspondence; and in insisting that whatever they are given to eat must be eaten. To ensure this a reliable nurse is placed in charge with instructions to see that every feed is completely consumed. No special diet and no elaborate calculation of calories need be undertaken. The commencing diet should be only slightly in excess of that to which the patient has reduced herself; but it should be rapidly increased and by the third week dissatisfaction is expressed if a gain of five or six pounds a week has not by that time been reached. Bitter tonics, acid, insulin, thyroid, and gastric lavage are all alike superfluous. If the stomach has been labelled "atonic" or "dropped," some work to do, and some omental fat to lie on, will accomplish all that is necessary.

Although the condition has undoubtedly a psychological basis the above régime should be begun at once, and psychological exploration should not go deep at least till after food is being taken normally.

There are many other points of interest and importance both clinical and therapeutic but they would unduly expand a letter. In brief, régime and not minutiæ of diet such as are so ably described by Dr. Allison and Dr. Davies, is the important thing. If this is not realised it becomes much more difficult to restore these patients to health. These remarks of mine, however, do not apply to many varieties of illness often but erroneously labelled anorexia nervosa which are really examples of hypochondria, psychotic depression and the like.

I am, Sir, yours faithfully,

R. D. GILLESPIE.

Wimpole-street, W., April 27th, 1931.

SYPHILIS AND YAWS.

To the Editor of THE LANCET.

SIR,—The relationship of syphilis and yaws presents a problem of the greatest interest to those who have studied the latter disease but one to which the majority of your readers may have given little thought. Captain Butler in your last issue animadverts upon the common facts that many statements are repeated in medical literature which are not true or which are no longer accepted by the bulk of medical opinion. Among these he would place the view that yaws and syphilis are separate disease entities, and he boldy exclaims "to-day it is possible to say that yaws is purely an artefact erected over the disease syphilis. This statement is made with the hope that some 'dualist' will produce evidence to the contrary. There has been ample time for all such evidence to assert itself." He points out that "since the time of Sydenham and long before him there have been English and Continental observers who thought and taught correctly about frambœsia. Berkeley Hill of English and E. Lancereaux of French physicians have shown how completely the yaws syndrome is identified with syphilis." I cannot help thinking that Captain Butler has been most unhappy in drawing inspiration from these two writers. Both wrote treatises upon syphilis, but neither had any first-hand knowledge of yaws, and in respect of this disease are guilty of that same fault in their writings of which Captain Butler complains. Their opinions were based upon the writings of others (Paulet for example) which they failed to interpret correctly. Their opinions upon yaws are absolutely valueless as will be apparent to anyone conversant with the older writers on frambœsia. Lancereaux was not even aware that the words pian and yaws referred to the same lesion, and Hill says of sibbens (a non-venereal epidemic syphilis) that it much resembles yaws, a statement which is quite untrue.

Not very much has actually been written upon the unity or duality of these two diseases but (without entering the ranks of the duellists to cross swords

with Captain Butler) I think it should be stated, lest Captain Butler's statement be given undue credence, that for the majority of those able to judge, yaws as a disease entity has appeared to withstand the onslaught of Captain Butler and others who hold opinions similar to his own. I think, moreover, that the dualists might quite fairly take up the opposite stand and express the view that the onus lay with Captain Butler to prove them wrong. As a non-partizan onlooker and without attempting to open a discussion I imagine he would be required to explain why no single case of absolutely undoubted syphilis has ever exhibited the typical pathognomonic florid eruption characteristic of yaws vouched for by an authority on frambœsia.

I am, Sir, yours faithfully,

HUGH STANNUS STANNUS.

Wimpole-street, W., April 25th, 1931.

DUROCAINE IN SPINAL ANÆSTHESIA.

To the Editor of THE LANCET.

SIR,—In the current issue of the *British Journal of Anæsthesia* Dr. Bernard Johnson describes his practice with durocaine, a pseudo-hypobaric solution of novocain. He puts the patient in the reverse Trendelenburg position after injection with the idea of spreading the drug upward over the roots. He says:

"In these cases it is usual to find that the lower limbs and the lower third of the abdomen become anæsthetised in about six minutes and that the remainder of the abdomen and lower thorax suddenly become anæsthetised after a varying period of time. It has been the writer's practice always to tilt the table to some degree of Trendelenburg position 15 minutes after the injection has been made. The reason for this delay cannot yet be stated, but it is probably due to some anatomical condition delaying the absorption of the anæsthetic."

In other words the novocain will not go up hill, but waits for the Trendelenburg position, for this mixture becomes a hyperbaric solution when diluted with cerebro-spinal fluid.

He injects 200 mg. of novocain into the spine of a child of 6 and up to 400 mg. in other cases.

"In both these cases one, a child of 6 years who was given 2 c.c. of anæsthetic solution making it up to 3 c.c. with cerebro-spinal fluid, and the other an elderly fat woman with some myocardial degeneration, the respiration became snatching and no pulse could be felt at the wrist or in the preauricular division of the superficial temporal artery; the common carotid artery could just be felt; the eyes rolled upwards; there was extreme pallor of the face and lips, and in fact the picture was of imminent death."

Later he says: "In regard to the toxicity of the solution, it can only be said that no toxic symptoms were detected in any of the cases." It would be interesting to know what would be accepted as good evidence of poisoning in this clinic, for an upward trend of the eyeballs is usually regarded with apprehension even in lay circles.

Koster's theory is entirely invalid, based on the fallacy of direct medullary action, and false deduction from experiments on small batrachians and not much larger mammals. The respiratory centre can be paralysed with as much certainty by an overdose of novocain as it can be with chloroform. In the cases quoted it was badly affected as evidenced by the "snatching" respiration. It is difficult to understand how so improbable a theory could have gained so much ready acceptance. Before Koster and Pitkin clouded the issue with untenable and unscientific theories, Labat's dosage of novocain up to 150 mg. was accepted as a maximum requirement, and this should only be exceeded in heavyweight patients with long spines. Labat is now making a similar protest. An injection of 200 mg. into a child of 6 should elevate the eyebrows of the onlooker as well as the eyeballs of the patient, for such dosage is beyond all reason. After such a recital is there any need to contest the competence of gliadine to prevent blood absorption?

Gum solutions were tried a generation ago and abandoned.

I propose to elaborate the proofs of my statements at Eastbourne in July, but in the meantime some criticism seems to be called for.

I am, Sir, yours faithfully,

London, W., April 27th, 1931. W. HOWARD JONES.

INSULIN AND PRESERVATIVE.

To the Editor of THE LANCET.

SIR,—We have been told that the Ministry of Health intends introducing a Bill which would necessitate the addition of antiseptic to those therapeutic substances which are administered by injection into the tissues, when sold in containers from which more than one dose has to be extracted. The value of such a regulation may appeal to some in the case of sera and other fluids which form excellent culture media for micro-organisms introduced accidently, and it will be remembered that the report of the commission which investigated the Bundaberg disaster advocated this step in the case of a mixture of diphtheria toxin and antitoxin.

However we would urge that there should be the most careful consideration and balancing of evidence before insulin is included in such a regulation. In the case of sera which are administered very infrequently to a patient, the simultaneous administration of a small amount of antiseptic can be of no consequence; but it must be remembered that insulin patients may be injecting themselves three times a day for years and it would be rash to assert that the daily administration of a small dose of antiseptic, such as trieresol, may not have some deleterious action in the course of years. Some little time ago a law was passed which made it illegal to poison the inhabitants of Great Britain by giving them small doses of food preservatives, and it would certainly be illogical to make it obligatory for diabetics in this country to give themselves small doses of poison two or three times a day continuously.

Of course if cases of sepsis follow from the administration of insulin which does not contain a preservative, the matter would be different, and one of our objects in writing this letter is to find out what has been the experience of others in this connexion. We would urge that further inquiries should be made in all countries where insulin free from antiseptic has been used and, only if evidence that cases of sepsis follow its use be obtained, that its sale in this country should be forbidden. The question also arises as to whether an ordinary solution of insulin is a suitable culture medium for extraneous bacteria provided the syringe and needle have not been sterilised in alkali, which if introduced into the container might reduce the acidity of the insulin solution, but would lead to turbidity.

A precaution that might quite well be taken would be to insist on this insulin being packed in colourless bottles and accompanied by instructions that, if the insulin does not look like perfectly clean water, it should not be used.

We are, Sir, yours faithfully,

O. LEYTON,

London, W., April 27th, 1931. E. P. POULTON.

UNDULANT FEVER IN SHIPS.

To the Editor of THE LANCET.

SIR,—Surgeon-Captain Dudley will perhaps allow me to thank him for clearing up the diagnosis of "*Thalia* fever" After learning that enteric was not caused by dirt unless the dirt was infected by the specific bacillus, I had often wondered whence came the germ of the pyrexia in stuffy ships; I had not allowed for carriers. Surgeon-Captain Dudley explains that fever as due to overcrowding, with brucella infection superadded. This view, however, seemed to me excluded by the long incubation, the "spleen generally normal," and other clinical difficulties. But if we look on overcrowding as the special box, and the carrier as the match which sets the epidemic alight, ship epidemics like those in the *Thalia* in 1883 and the *Seaflower* in 1882 become intelligible. What is now wanted is an agglutination test of catarrhal and bronchitic cases in the Mediterranean to prove that brucella infection is prevalent, though no infected milk is drunk.

I would like to submit that, assuming that undulant fever in the Navy first appeared in the *Hannibal* and other ships at the time of the Crimean war, perhaps it came from the Crimea. Now that it can be exactly diagnosed by agglutination, the fever is always being reported from the east end of the Black Sea, from Azerbaijan, Armenia, Batoum, and quite lately [1] by Rudnew and Krumberg, from Rostoff-on-Don, at the top of the Sea of Azof, quite close to the Crimean Peninsula. May it not have existed there unrecognised in 1854?

I am, Sir, yours faithfully,

April 25th, 1931. W. E. HOME.

THE LATE MARGARET McMILLAN.

To the Editor of THE LANCET.

SIR,—I have been entrusted with the task of writing a record of the life and work of the late Margaret McMillan. It will assist materially if any of your readers will send to me any important letters, papers, or pamphlets they may possess. Personal memories would be most helpful. All documents will be returned in due course.

I am, Sir, yours faithfully,

ALBERT MANSBRIDGE.

38, High Oaks-road, Welwyn Garden City, Hertfordshire. April 21st, 1931.

A SIMPLE METHOD FOR BLOOD CULTURE.

To the Editor of THE LANCET.

SIR,—With reference to Dr. Burnet's letter in your issue of March 28th (p. 729), I wish to state that I was not aware of the existence of a similar device. The essential part of my apparatus is the use of the Viskap which keeps the cap sterile until ready for use, and this, as far as I know, has not previously been used for the purpose described. I have examined the specification and I find that Dr. Burnet's patent No. 187900/22 is limited to a washer which consists of a layer of spongy rubber interposed between two ordinary impermeable rubber discs. As the apparatus described by me contains only a single rubber disc I am advised that anyone is entitled to use it without infringing any patent.

I am, Sir, yours faithfully,

J. E. MCCARTNEY.

Southern Group Laboratory, Park Hospital, Hither Green, S.E., April 27th, 1931.

[1] Arch. f. Schiffs- u. Tropen-Hygiene, February, 1931, p. 81.

TUBERCULIN-TESTING OF MILCH COWS.

To the Editor of THE LANCET.

SIR,—There appears to be a general impression that a large number of the cattle in tuberculin-tested herds react to the prescribed six-monthly test. This is not a fact. The figures on this farm, which is an ordinary dairy farm milking 80 cows and producing certified milk, are as follows. The herd was started in 1918 and the double intradermal test has been employed since this method was in general practice. Previously to this the subcutaneous test was carried out, but the former has undoubtedly proved the more efficient for the purpose of eliminating tuberculosis. It is, therefore, on the use of this test that these remarks are based.

In March, 1928, a licence for certified milk was taken out, and this demands a test every six months. The half-yearly tests have included all the cows in milk, dry cows, bulls, and in-calf heifers likely to come into the herd during the subsequent six months. These have averaged 120 for each half-yearly test. For two years we had not a single reactor, that is until March, 1930, when, owing to the fact that we were having a sale of a considerable portion of the pedigree stock because of lack of accommodation, all animals over ten months were tested, making a total of 156. Of this number, five failed to pass the test. One was a bought-in cow and the others were all first calf heifers. These heifers were known to have been in accidental contact with one or two possible sources of infection. In September, 1930, 106 animals were tested, and there was one reactor—a bought-in cow. In March, 1931, we had three reactors out of 120 animals tested. All three had been bought in since September, after passing the test. These reactors were in splendid condition, with no signs whatever of diseased udders.

If a herd is freed from tuberculosis, if no new animals are imported into the herd, and if there is no chance of contact with others not known to be free from disease, there is practically no risk of re-infecting the herd, providing that care is taken when purchasing hay and straw from other farms to ascertain that cattle have not had access to it, and that the water-supply is free from all possibilities of contamination.

I am, Sir, yours faithfully,

L. A. FOOT.

Hamberlins Farm, Northchurch, Berkhamsted. April 22nd, 1931.

ROYAL VICTORIA HOSPITAL, BELFAST.—The annual meeting of this hospital was held on March 25th with the Duchess of Abercorn in the chair. The total admissions to the wards in 1930 amounted to 5947; new cases to the extern department numbered 55,665; the total attendance of old cases registered was 99,069. The observation wards were of great service; 1557 cases were treated there, of which 246 were subsequently admitted to the wards. The disbursements for the year were £61,894, and the receipts £60,775. A gratifying feature of the revenue account was the steadily increasing contributions from workpeople, which in spite of adverse trade conditions show an advance of £1408, realising the total of £25,327. A considerable amount of dissatisfaction was expressed that the National Radium Trust and the Radium Commission have not extended the distribution of radium on loan to hospitals in Northern Ireland, although the Royal Victoria Hospital fulfils all the conditions laid down for the formation of a radium centre. However, the hospital is developing a radium centre for Northern Ireland on the same lines as prescribed by the Commission in Britain, and through the generosity of the Viscountess Pirrie, and a few anonymous donors, a stock of radium valued at £3314 has been supplied. To supplement this the board has obtained a special loan of £4000 for the purchase of further radium, and delivery is expected in a few weeks. It is hoped that donations will be forthcoming to the radium fund to wipe out this indebtedness.

PARLIAMENTARY INTELLIGENCE

NOTES ON CURRENT TOPICS.

HOUSING (RURAL WORKERS) AMENDMENT BILL.

ON April 21st in the House of Commons Mr. ADAMSON (Secretary of State for Scotland) moved the second reading of the Housing (Rural Workers) Amendment Bill. He said that the object of the measure was to extend for a further period of five years the Housing (Rural Workers) Act, 1926. The principal Act arose out of representations by local authorities in rural areas to the effect that the grants for the erection of new houses were not wholly suitable to the circumstances of those areas. The local authorities urged that what was required was a grant towards the expenses of reconstruction and improvement of existing houses for farm workers and other persons of similar economic condition, the problem in many rural areas being not so much that there was a shortage of houses as that the existing houses required to be modernised and supplied with the recognised conveniences. Considerable advantage had been taken of the provisions of the Act of 1926, and it had been the means of providing improved and healthier housing accommodation for a large number of rural workers. Much of the work which had been done under the Act had consisted of the introduction of water, baths, and w.c.'s into houses; the provision of sculleries; the renewal of defective roofs and floors; the adoption of measures to do away with dampness, and the provision of larger windows to permit of better lighting and ventilation. The average grant given by Scottish local authorities had worked out in the course of five years at £86 per house, and in England the corresponding figure was £78 per house. Towards these grants the Exchequer contributed one-half in the form of an annual payment spread over a period of 20 years. Of the 33 county councils in Scotland, 32 had had schemes of assistance approved, and the remaining one had decided to adopt a scheme. In addition, schemes had been approved from 28 burghs. In England, he was informed, schemes had been approved from 297 authorities, including 46 county councils and 146 rural district councils.

Mr. GREENWOOD (Minister of Health) said when the Act of 1926 was being passed he did not believe, and he never had believed, that this method would prove to be acceptable on a very large scale to the local authorities of the country, but in so far as it could be used to make a practical contribution to the solution of the housing problem in rural areas, he thought the Government ought to give it their support. He had done what had been possible to encourage the adoption of the 1926 Act during the past few years, but he had been disappointed with the results. He had been induced to back a Bill for the extension of the 1926 Act because of the relative success it had met with in Scotland. For what it was worth, and within its narrow limitations, he hoped that the Act would be continued and that it might be more fully used.

SANIFYING OLD COTTAGES.

Lieut.-Colonel FREMANTLE said that this was one of the measures which showed the line along which they could usefully proceed in agricultural districts. The other view was that they should sweep away the old and get the new and the very best. As a medical officer of health he had heard people who were enthusiastic for good housing suggest that the old houses in villages should be swept away, and new ones built in their place, but he felt that that would involve a great deal of unnecessary waste. Cottages built in the middle of the last century were not up to date, but they could be made useful and sound by a certain measure of reconstruction. It must be bold reconstruction, and the 1926 Act provided for that. It was by an extension of that Act that they would be able to cope with the housing problem in rural areas. He was glad that the Labour Government had been converted to the usefulness of the measure passed by the late Conservative Government.

Major ELLIOT said that those who introduced the 1926 Act were only too pleased that it had now found favour in the eyes of some of its bitterest critics, and they were only too glad to support a Bill extending it for another five years.

After further debate the Bill was read a second time without a division.

SICK AND INFIRM VOTERS AT ELECTIONS.

On April 22nd the House of Commons went into Committee on the Representation of the People (No. 2) Bill. Sir R. YOUNG (Chairman of Committees) was in the chair.

On Clause 6 (Restriction on the use of vehicles at Parliamentary elections) Major ELLIOT moved an amendment to insert the following: "Provided that nothing contained in this section shall, subject to the provisions of the Corrupt and Illegal Practices Prevention Act, 1883, prohibit any person from conveying to the poll any elector who by reason of age, bodily infirmity, or other incapacity would be unlikely to vote unless conveyed to the poll." He said that it would be agreed that the small number of persons who were covered by this subsection ought to have every possible consideration. They all knew how difficult it was to arrange for cars for those persons who were found in the course of an election to be sick or infirm or liable not to vote unless conveyed to the poll. It was those emergency cases arising on polling day which would be ruled out by the very stringent provisions of this clause unless some step was taken to meet the point. The proposed proviso might not be ideal, but it was an attempt to deal with the situation.

Lieut.-Colonel FREMANTLE said that the probability was that there would be very few motor-cars of which the returning officer would have control, and if, as was frequently the case, in any particular constituency there might be one or more institutions containing between them hundreds of electors who were bodily infirm and unable to go to the poll on foot, the returning officer might not have sufficient motor-cars to accommodate them. There were many electors who would be quite prepared to lend motor-cars to take such people to the poll, but they would not give their cars to the pool under the returning officer. If this proviso was not allowed the Government would be branded in many constituencies with having deprived the sick, the aged, and the infirm of the possibility of exercising their votes.

Mr. CLYNES (Home Secretary) said that he quite admitted that there was something in the idea of the amendment. It might well be that there was in every Parliamentary constituency a group of persons quite unlike the general body of the electors in such a condition of infirmity as to be physically disabled from going to the poll like the rest of the electors, and in such a condition as not to feel quite safe going with groups of other people, and who would therefore desire to be conveyed in an ordinary private way by friends of their own who had a motor-car at their disposal. He could assure Major Elliot that the Government would consider the matter sympathetically before the Report stage in order to see if some words could be devised to cover what the hon. Member had in mind.

After further debate, the amendment was negatived by 250 votes to 142.

WORKMEN'S COMPENSATION BILL.

On April 24th the House of Commons passed the third reading of the Workmen's Compensation Bill. This is a measure which has been introduced to deal with difficulties in the law of workmen's

compensation which have arisen owing to the judgment of the Courts in the case of Bevan *v.* Nixon's Navigation Company. The effect of that judgment was to cut down materially what had hitherto been regarded as the scope of the Act of 1925 which consolidated the Act of 1923. Up to the time of the Bevan *v.* Nixon decision it was thought that an employer was bound to find work for an injured workman or to provide compensation. The Bill is made retrospective to Jan. 1st, 1924, and under its provisions the Bevan *v.* Nixon's Navigation Company judgment will not apply in respect of cases which happened on or after that date.

THE BUDGET.

In the House of Commons on April 27th Mr. SNOWDEN, the Chancellor of the Exchequer, made his annual Budget statement. In the course of his speech he stated that the estimates of expenditure for 1931–2 totalled £803,366,000, as compared with an estimated revenue of £766,000,000. This left a gap to be bridged of £37,366,000, which was a deficit greater than that of last year's actual deficit of some £14,000,000. This result was mainly accounted for by the need of providing £12,000,000 more for de-rating. Provision had also to be made for £30,000,000 for transitional unemployment benefit. To meet this deficit £20,000,000 would be provided by a reduction of that amount in the exchange account, following the Hague Agreement and the institution of the Bank of International Settlements. In 1931 income tax under Schedules B, D, and E in the case of certain taxpayers, instead of being paid in two equal instalments, would be paid in instalments of three-quarters and one-quarter on Jan. 1st, 1932, and July 1st, 1932, respectively. Taxpayers concerned in this change will be individuals and firms engaged in trades, professions, or husbandry and employees. The result would be that the Exchequer would gain an extra quarter of a year's tax within the current financial year. The estimated yield was £10,000,000. There would also be an increase in the duty on oil from 4*d.* to 6*d.* as from April 26th. The proposed increase would still leave petrol no dearer than it was before March, 1931, and lower than it was before September, 1930. It would be slightly less than it was after the original 4*d.* duty was imposed. It was expected that the increased duty would not appreciably affect consumption. The estimated yield was £7,500,000 in the current year, and over £8,000,000 in a full year. The balance-sheet, therefore, left a nominal margin of £134,000. No provision was made for supplementary estimates. If prosperity returned a margin might be found in an excess yield from taxation above the estimates he had forecasted. Apart from this, gaps would have to be met by economy in national expenditure. Provision would be made in this year's Finance Bill for (*a*) a valuation, and (*b*) the imposition of a tax on land values. It was hoped that the valuation would be completed within two years of the passing of the Bill, and would therefore be available as the basis on which to charge an annual tax for 1933–34 and subsequent years. The tax would be at the rate of 1*d.* per £ of land value.

PHARMACY AND POISONS BILL.

In the House of Lords on April 27th the Pharmacy and Poisons Bill passed through Report.

YARMOUTH NAVAL HOSPITAL BILL.

The Commons amendments to the Yarmouth Naval Hospital Bill were considered and agreed to.

HOUSE OF COMMONS.

WEDNESDAY, APRIL 22ND.

Pensions for Neurasthenia and Shell Shock.

Mr. PRICE asked the Minister of Pensions whether, in view of the effect on the nerves of ex-Service men suffering from shell shock and war neurasthenia of the uncertainty as to the continuance of their pensions, he would consider the question of making these pensions permanent after they had been in receipt of them for the last eight years.—Mr. F. O. ROBERTS replied: Of the total number of pensions in payment for neurasthenia and shell shock about 90 per cent. have already been made permanent. I can assure the hon. Member that the possibility of making final awards in the remaining cases will be constantly kept in view. To make such awards in cases which are not medically suitable for them would not be in the best interests of pensioners generally.

Child Mortality in Hong-Kong.

Mr. GRAHAM WHITE asked the Under Secretary for the Colonies whether, seeing that some official information was available with regard to 1724 out of 1851 dead bodies of children of three years of age and less picked up in the streets of Hong-Kong during 1929, he would call for a report upon the remaining 127 dead bodies; and whether in any case death was due to violence.—Dr. SHIELS replied: Of the 127 bodies, 98 were those of children over three years of age, and 29 were infants of unknown sex. The Governor was requested by my noble friend to state whether in any of the 1851 cases reported for the year 1929 death was due to violence, and he has replied that in no case was there found to be any evidence of violence. In 521 cases of children of three years or under the cause of death was found to be small-pox.

Imported Milk.

Miss PICTON TURBERVILL asked the Minister of Agriculture whether he would inform the House how much per cent. of the milk consumed in Great Britain was imported, showing condensed milk and imported dried milk separately.—Mr. W. PALING (Lord of the Treasury) replied: On the basis of estimates for the years 1924 to 1927, contained in "The Agricultural Output and the Food Supplies of Great Britain," 1929, which are the latest complete figures available, it is calculated that after converting preserved milk into its estimated equivalent in liquid milk, approximately 8 per cent. of the milk consumed in Great Britain is imported, of which condensed milk accounts for rather over 7 per cent., and milk powder for rather under 1 per cent.

THURSDAY, APRIL 23RD.

Standard of Imported Milk Products.

Mr. OSWALD LEWIS asked the Minister of Health whether his attention had been called to the fact that the importation or sale of milk preparations not containing prescribed minims of milk fats was prohibited in 24 countries in the British Empire and in 20 foreign countries; and whether he would consider the desirability of promoting similar legislation in the interests of public health in this country.—Mr. GREENWOOD replied: I am aware of the fact stated, but I do not think it is necessary in the interests of the public health to introduce legislation for this country similar to that referred to.

Mr. LEWIS: Why should we be satisfied with a lower standard in this country?

Mr. GREENWOOD: I am not satisfied that it is a lower standard.

Sir A. STEEL-MAITLAND: If a minimum of butter-fat is prescribed for fresh milk should there not be a minimum for preserved milk?

Mr. GREENWOOD: The point of the question related to public health, and I understand that there is no reason on that account for altering the law.

Rejection of Army Recruits.

Mr. TINKER asked the Minister of Health if he was aware that from October, 1929, to September, 1930, 66,717 men offered themselves for service in the army, and 52 per cent. were rejected on physical grounds; and if his department had done anything to find out what were the physical disabilities, so that steps could be taken to advise the House of Commons on adopting measures to improve the physical standard of our people.—Mr. GREENWOOD replied: I understand that the facts are as stated in the first part of the question. As regards the second part, my department has obtained full information on this subject from the War Office, and it will receive my careful consideration.

Earl WINTERTON: Has the right hon. gentleman seen a manifesto issued by a number of doctors stating as one of the reasons for this deplorable physical condition and these deficiencies as to health and teeth, that they are due to the artificial foods eaten in this over-industralised country; and will the right hon. gentleman have that report considered by the appropriate experts in his department?

Mr. GREENWOOD indicated assent.

Approved Societies and Voluntary Hospitals.

Lieut.-Colonel FREMANTLE asked the Minister of Health the approximate estimated cost of the services rendered by voluntary hospitals to members of approved societies; and what contributions were made by approved societies

to the funds of voluntary hospitals in return for such services.—Mr. GREENWOOD replied: No material is available to enable any estimate to be made of the cost of the services rendered by voluntary hospitals to members of approved societies. The total amount allocated by societies in England in payments to hospitals under schemes consequent upon the second valuation was at the rate of about £300,000 per annum. Schemes based on the third valuation are at present in operation in societies covering only about one-quarter of the total insured population, but under those schemes the annual amount allocated to hospital benefit has been increased by about 14 per cent. above that previously allocated.

Lieut.-Colonel FREMANTLE asked the Minister of Health if, in view of the fact that last year University College Hospital treated over 2000 members of approved societies at a cost of £22,000, towards which the societies contributed only a little more than £3000, and that of 124 of these societies whose members were admitted to the hospital 44 contributed part of the cost and 80 contributed nothing, he would take steps to bring the claims of the voluntary hospitals to the notice of approved societies in connexion with the allocation of their disposal surpluses.—Mr. GREENWOOD replied: The attention of all approved societies has already been directed to the provisions of the National Health Insurance Act, under which they are empowered to allocate part of any disposable surplus disclosed on valuation to the making of payments to hospitals in respect of the maintenance and treatment of their members therein.

Lieut.-Colonel FREMANTLE: Is it not possible for the right hon. gentleman to draw the attention of the societies to the fact, which they probably do not realise, that they are getting very much more from the voluntary hospitals than is covered by the small contributions which they make? I am sure they wish to pay their own way.

Mr. GREENWOOD: I am prepared to do what I can, but I have no power to enforce it.

Mr. GOSSLING: Is the right hon. gentleman aware that the great bulk of the workpeople who are compulsorily insured are contributing week by week to the Hospital Saturday Fund.—No answer was given.

Rheumatic Diseases.

Mr. GRAHAM WHITE asked the Minister of Health if, in view of the new efforts being made to combat the evils arising from rheumatic diseases, he would now consider the advisability of setting up an advisory committee on rheumatism on the same lines as the advisory committee on cancer.—Mr. GREENWOOD replied: I have given careful consideration to this suggestion and have come to the conclusion that I should not be justified at the present time in setting up such a committee as is mentioned in the question.

Factory Medical Officers.

Dr. HASTINGS asked the Home Secretary the number of persons employed in factories and the number of full-time medical officers in the factory service.—Mr. SHORT replied: According to the Workmen's Compensation returns for 1929—the last year for which figures are available—the number employed was 5,531,322, including 347,480 outside workers. As regards the latter part of the question, the only whole-time official appointments are the Medical Inspectors of Factories who now number eight. The certifying and other surgeons who are appointed under the Factory Act for particular duties and who number about 1800 are part-time posts.

Veterinary Research Institute.

Mr. LEES asked the Minister of Agriculture whether his attention had been called to the financial situation of the Veterinary Research Institute of Camden Town; and whether he would be prepared to recommend to the Chancellor of the Exchequer that a special grant be given to keep the institute in reasonable efficiency.—Dr. ADDISON replied: Yes, Sir. I am well aware of the financial position of the Animal Pathology Research Institute attached to the Royal Veterinary College at Camden Town. A scheme for the development and research in animal diseases upon a considerable scale is in an advanced stage of preparation and will, I trust, be sanctioned and brought into operation at no distant date.

Medical and Dental Scholarships.

Dr. HASTINGS asked the President of the Board of Education whether any maintenance scholarships were provided by his department to secure for children from the secondary schools training for the medical and dental professions.—Mr. LEES-SMITH replied: No scholarships provided by the Board of Education are specifically earmarked for students proposing to be trained for the medical and dental professions; but 300 State scholarships are offered annually to pupils from grant-aided secondary schools to enable them to take up courses at Universities for Honours degrees, including those in Medicine and Dentistry, or preliminary science courses.

MONDAY, APRIL 27TH.

National Health Insurance Funds.

Mr. GRACE asked the Minister of Health whether he would give the figures of the accumulated funds of approved societies for the last three available years, and the respective amounts which had been invested by or on behalf of approved societies for those years.—Miss LAWRENCE (Parliamentary Secretary to the Ministry of Health) replied: The accumulated funds of approved societies in Great Britain amounted to £115,500,000 at Dec. 31st, 1928; £113,000,000 at Dec. 31st, 1929; and £114,000,000 at Dec. 31st, 1930. The amounts invested by or on behalf of approved societies have been £1,000,000 for 1928; £1,000,000 for 1930. For 1929 investments were realised to the amount of £2,500,000.

Public Vaccinations.

Mr. FREEMAN asked the Minister of Health whether he would furnish a statement showing the number of public vaccinations and re-vaccinations, respectively, carried out in England and Wales in each year during the last ten years, and the expenditure incurred out of national and local funds respectively, together with the number of deaths from small-pox during each of the years in question.—Mr. GREENWOOD replied: The following statements give these particulars for the last ten years for which complete figures are at present available: (1) Statement showing the number of public vaccinations and re-vaccinations, and the number of deaths from small-pox, in each of the ten years 1920 to 1929.

Year ended Sept. 30th.	Number of successful primary vaccinations.	Number of successful re-vaccinations.	Deaths from small-pox in the year ended Dec. 31st.
1920 ..	258,996	12,898	30
1921 ..	245,154	26,775	5
1922 ..	223,838	12,887	27
1923 ..	415,549	316,641	7
1924 ..	331,522	89,600	13
1925 ..	270,755	40,939	9
1926 ..	279,721	54,221	18
1927 ..	305,005	113,117	47
1928 ..	320,687	163,918	53
1929 ...	258,986	104,397	39

(2) Statement showing for each of the ten years 1919–20 to 1928–29 the total expenditure of *local authorities* on vaccination, the receipts from Government grants, and the balance of the expenditure met out of rates, &c., together with the total cost of the Government lymph establishment

Year.	Total expenditure.	Receipts from Government grants.	Balance falling on rates, &c.	Government lymph establishment.*
	£	£	£	£
1919–20	133,265	9,247	124,018	11,973
1920–21	183,789	8,862	174,927	20,004
1921–22	172,558	10,323	162,235	16,214
1922–23	191,416	10,244	181,172	14,489
1923–24	235,677	11,753	223,924	16,553
1924–25	182,077	3,050	179,027	14,205
1925–26	166,255	4,366	161,889	14,430
1926–27	179,066	8,338	170,728	14,386
1927–28	190,754	8,853	181,901	15,324
1928–29	191,643	10,522	181,121	15,377

* Of the total cost of the Government lymph establishment, 15 to 20 per cent. in each year is attributable to the cost of lymph supplied to the service departments.

GLASGOW EAR, NOSE AND THROAT HOSPITAL.—Lord Provost Kelly, presiding at the fifty-first annual general meeting of the hospital, said he was glad for once to be speaking for an institution in which there was no deficit for the preceding year. The new building had only been opened for four years, but its resources were already taxed to the utmost and plans were being considered for an immediate further extension. The necessary ground had been obtained through the generosity of an anonymous donor, and funds were now required to provide the building. It was a sad feature of the work of such a hospital that so many children required treatment; 4602 under 15 years of age were treated during the previous year, and there were indications that a tremendous amount of work was still necessary in connexion with child health in Glasgow.

HOSPITAL OUT-PATIENTS.

THE PRACTITIONER'S POINT OF VIEW.

AT a meeting of the St. Pancras Division of the British Medical Association on April 28th, Dr. W. A. M. SWAN took the chair and explained that the gathering was called to consider the B.M.A. Council's recent report on out-patients.[1] The question vitally affected the general practitioner, whose proper work was being taken from him by the increasing competition of the great voluntary hospitals. It was impossible for those hospitals to give adequate treatment or to get the best results from their material and equipment when they were snowed under by an unmanageable number of out-patients; neither was time and sufficient opportunity given to students to derive the best benefit from the cases. A hurried examination of the patient was followed by prescription of a fortnight's medicine, a state of affairs which reflected no great credit on either the hospitals or the profession. An object of this meeting was to help the B.M.A. to end this state of affairs and replace it by something better. Members of hospital staffs had been invited to attend, so that all sides could be discussed. The conclusions and recommendations of the Council were as follows:—

1. That a large amount of the work at present undertaken at the out-patient departments of voluntary hospitals is unnecessary and can be reduced.
2. That the volume of work at present undertaken at the out-patient departments is such that the best use cannot be made of the services of the members of the hospital staffs.
3. That there is considerable wastage of public money and of professional time and skill.
4. That the existing internal and external checks at present employed are not sufficiently stringent.
5. That further checks and safeguards should be established at all voluntary hospitals before treatment is undertaken at the out-patient department.
6. That the primary object of the out-patient department should be for consultation.
7. That while there should be adequate opportunities for consultation purposes between the private practitioner and members of the visiting medical staffs at out-patients departments, practitioners should not countenance the use of that department by their patients, except in the ways laid down in this memorandum.
8. That the casualty department should be available in any emergency.
9. That only such treatment should be given at the department as cannot in the best interests of the patient be obtained elsewhere under the usual arrangements as between private practitioner and private patient, or under contract arrangements.
10. That cases admitted for treatment at out-patient departments should be reviewed at regular intervals by the medical staffs.
11. That no person, except in cases of emergency, should be accepted for treatment as an out-patient at a voluntary hospital unless he brings a recommendation from a private medical practitioner, a provident or other dispensary, a public clinic, or from a public assistance medical officer of a local authority.
12. Where out-patient departments are shown to be necessary in connexion with council hospitals, the principles applicable to voluntary hospitals, as set out in the preceding paragraphs, should apply.

THE HOSPITAL'S ATTITUDE.

Major R. R. GARRATT (Secretary, Royal Free Hospital) said this subject had been before the authorities of his hospital for a long time. The hospital tried to be of the greatest possible usefulness to the public, and it had appointed a subcommittee to ascertain how this and other problems connected with the out-patient department could best be served. The demand for hospital treatment and care came from the patient himself, and that being so, the hospital authorities were unable to keep him away. Patients felt that at hospital they could be sure of having a more thorough examination than at the hands of the general practitioner. Therefore the matter rested a great deal with the members of the profession. To obtain hospital advice and treatment, patients seemed quite willing to wait a considerable time. No hospital wished to have its out-patient department overcrowded with chronic cases. In every well-organised hospital every effort was made to refer patients back to their own general practitioner, but patients could not be forced to go back to him. Also, patients were encouraged to bring a letter from their doctor, for he agreed that the prime function of the out-patient department should be consultative. Usually it was found that the panel doctor was not one who was ready to give a patient a letter to take to a particular hospital. At the teaching hospitals there must be adequate clinical material, and the quality of the material was not known until an examination had been made. If there could be devised a simple system of reference back to the practitioner from the hospital, the Royal Free Hospital would support it.

The LADY ALMONER of the Royal Free Hospital said that consideration for the patients must come first, and for their comfort the numbers must be reduced. It was now more important than ever that the hospitals should be consultative centres. About half the panel patients who came to hospital did not bring letters.

Miss ELIZABETH BOLTON said that to many very poor patients a levy was a great hardship.

Dr. H. S. BURNELL-JONES thought no out-patient should be seen unless he presented a letter from his doctor. The sympathetic coöperation of hospital staffs was necessary for dealing with this question.

Mr. JENNER VERRALL spoke on the special department aspect. It was the exception, he said, for a patient to reach his department at the Royal Free Hospital without presenting a letter from his doctor, and he believed that was true also of the other special departments of the hospital. He never inquired whether a patient was a panel patient. He made a big effort to personally answer all the letters brought by patients; but it was difficult, and there was a great need of clerical assistance. He expressed a strong objection to the suggestion behind recommendation No. 10 that cases should be reviewed at regular intervals by the medical staffs. Surely that was the practice at every hospital?

Mr. J. WIGG contended that some 80 per cent. of the population were provided in some way with medical service, and the solution of the present out-patient difficulty lay largely in the hands of the practitioners in the district. A member of his staff had suggested that blocks of forms should be used, perforated down the centre, one side containing particulars of the patient to be sent with him to the out-patient department, and the other retained by the practitioner.

TOO MANY OUT-PATIENTS.

Dr. PEARSON said that nowadays patients got the best available service; the question was whether it was very costly, or whether people should be allowed to attend out-patient departments as much as they did. Certainly the out-patient department should be used more for consultative purposes;

[1] See Brit. Med. Jour. Supplement, Feb. 21st.

but if the attendances were cut down very much, the educative value of the institution would be largely destroyed. The only real solution that he could see was to insist that each patient should bring a doctor's letter.

Dr. TURNER spoke of the large demands made on hospitals by members of the Hospital Saving Association. They paid 3*d*. a week against the possibility of needing hospital treatment, and mostly seemed bent upon getting their money's worth.

Dr. OWEN THEOBALDS said that many people were now drifting into hospitals who formerly would not have thought of doing so, and in many cases—he gave examples—they were receiving free what they could well afford to pay for in private consultation.

Mr. A. C. ADAMS (Secretary, National Temperance Hospital) spoke of the valuable work done by almoners in checking the abuse of hospitals. At his hospital every effort was made to eliminate non-essential cases as much as possible. The Hospital Saving Association and other kindred bodies rendered a solution of this subject more difficult than it would otherwise have been.

Dr. P. P. DALTON warmly resented the veiled attacks which had been made on panel practitioners; it had been said that when patients brought up Hospital Saturday Fund letters they were carefully scrutinised, and panel patients were returned to their doctors. Yet the panel doctor was the personal family doctor; he was not a separate entity. In London at the present time public charity was being grossly abused. In all directions money was being collected for charitable purposes—i.e., for the destitute poor—and was being largely spent on those who could not only afford private fees, but were sometimes better off than those who subscribed. The general practitioner was being stamped out of existence, and when the process was complete, who would be at the call of the family for medical attendance, for confinements, &c.? Hospitals would not take on that work. As much money was being subscribed for hospitals as before the war. The grants to hospitals from the King's Fund were not according to the number of cases they cured, nor according to the number of cases passing through their beds, but according to the number of out-patient attendances they scored; so that if a hospital had its out-patients coming twice as often, or had twice as many out-patients, it would receive an increased grant. Practitioners could not help regarding themselves as competitors with the hospitals, and he urged coöperation with hospital staffs as a solution of the difficulty.

THE PATIENT'S RIGHTS.

Dr. GEOFFREY EVANS said the B.M.A. thought of the doctors first, and it made a fundamental mistake in its policy in not thinking of the public first. If it did it would strengthen its position. Patients must be allowed their freedom. He disagreed with the idea that patients should not be seen at hospital unless they came armed with a letter from their doctor. But he wrote a letter about every patient he saw. Dr. J. H. Drysdale gave him this advice: "You sit in your room and see people who ask your advice; you use your discretion as to whether you give your opinion; and you can say to the patient 'before I give my opinion I will talk your case over with your doctor.'" Doctors worked for people who appreciated their work. If the B.M.A. tried to tie people to their doctors and they succeeded in it, they would collapse. Recommendation No. 11 he regarded as a scandal; it was ethically wrong. When he saw patients he did not inquire about their income, he only wanted to know what their complaint was, and, having ascertained that, he did his best for them. He disliked the statements about doctors being in competition with hospitals. It was not the first object of teaching hospitals to be consulting centres; that was their second object. Their first object was the teaching of the profession and the study of medicine.

CANCER OF THE LIP, TONGUE, AND SKIN.

A MEMORANDUM FROM THE MINISTRY OF HEALTH.

THE eighth of a series of memoranda on cancer being issued from the Ministry of Health for the guidance of local authorities has just appeared.[1] This memorandum relates to cancer of the lip, tongue and skin, and is based largely upon an examination, including a statistical analysis of such matters as lend themselves to the process, of available published writings on cancer of these organs.[2] Malignant growths in these three organs have in common a character which may facilitate their early recognition, or even preventive treatment. This character is the persistence prior to the development of the cancer of an apparently harmless or at least non-cancerous condition. Advantage can be taken of this warning only if suitable instruction and advice is provided for the community.

This group of cancers provides opportunities for the application of preventive medicine, in the modern sense, in three aspects: (1) Prevention or removal of conditions associated with causation. (2) Curative treatment of abnormal conditions likely to develop the cancerous change. (3) Surgical removal, by operation, radiation, &c., of the actual cancer at an early stage.

Some of the preventive measures available concern the education of the community to the realisation that certain habits, such as smoking or chewing tobacco, or picking or scratching warts or moles, may set up "chronic irritation" of some parts of the body, notably the skin or the orifices, and that any chronically irritated area which after a time shows a marked change should be submitted to medical examination and treatment without delay.

Avoidance of syphilitic infection, attention to oral hygiene, elimination of environmental factors which may adversely affect the health of industrial workers, are also mentioned.

Special measures are advised in relation to substances used in industry, such as certain oils and tars, tar derivatives, arsenic and soot which may contain carcinogenic agents, and to workers who come into contact with them.

It is noted that the avoidance of unnecessary exposure to X rays and the adoption of suitable precautions has resulted in new cases of the preceding inflammatory condition of the skin becoming very rare, and it is anticipated that this variety of the disease will in due course be eliminated.

[1] Circular 1186. H.M. Stationery Office.

[2] See Reports on Public Health and Medical Subjects. No. 59. H.M. Stationery Office. May, 1930.

BRITISH ORTHOPÆDIC ASSOCIATION.—The Robert Jones medal and association prize of this association has been awarded for 1930 to Mr. Harold Clifford Edwards for an essay on Injuries of the Tendons and Muscles.

OBITUARY

HENRY PERCY DEAN, M.S. Lond., F.R.C.S. Eng.,

CONSULTING SURGEON TO THE LONDON HOSPITAL.

WE regret to record the death of Mr. Percy Dean which occurred at his house in Abinger-road, Bedford Park, on April 14th in his sixty-seventh year.

Henry Percy Dean was born in London and educated at University College, London, and at the medical school at University College Hospital. He distinguished himself as a student, being scholar and medallist in the University in physiology, holding one of the surgical exhibitions, and obtaining the gold medal in anatomy. He graduated as B.Sc. in 1884 and as M.B., B.S. four years later, while he took the M.S. Lond. in 1889 and the F.R.C.S. Eng. in the same year. Having held the usual residential posts he became assistant surgeon at the London Hospital in 1892 and obtained charge of beds as full surgeon in 1899. As hospital officer and as teacher of operative surgery at "The London" he made a distinct mark, while he also had a well-deserved reputation as a pædiatrist, due to his long connexion with the Queen's Hospital for Children. For a considerable period he was also a surgeon to the Royal Northern Hospital.

Dean was a clear and well-informed writer, and his contributions to medical literature, though neither many nor long, were definitely valuable. In his earlier writings his physiological equipment was obvious. On the innervation of the pulmonary vessels he contributed a paper to the Proceedings of the Royal Society in 1889, and he wrote on the same subject in the *Journal of Physiology* a few years later. To the Proceedings of the Neurological Society he made an interesting contribution upon the temperature of the two sides of the body in cerebral compression, a paper which was followed by one published in the *Journal of Pathology* on Cerebro-spinal Pressure. To THE LANCET he communicated an account of a successful operation for cerebellar abscess. He was also author of the articles on injuries and diseases of the head in Treves's "System of Surgery," and he edited Heath's "Injuries and Diseases of the Jaw."

Dean was still under 50 when he retired from hospital practice, being made consulting surgeon to the London Hospital in 1913, a position which he also occupied at the Queen's Hospital for Children. He was a Fellow of University College, London.

THE LATE MAJ.-GEN. G. F. A. HARRIS, I.M.S.

AN old colleague and friend writes: "I would be glad of your permission to supplement the account of the official career of General Harris in THE LANCET of April 25th, by a reference to his personal qualities. Distinguished alike in his profession and in the service to which he was devoted, he earned the confidence and esteem of all who had the good fortune to serve with him or under him. After his retirement onward he continued to take an active interest in medical and service questions. During the late war he returned to duty and worked on an Army medical board and as an inspector of V.A.D. hospitals. There are few whose loss will be more generally deplored by brother officers and friends."

TYRRELL COTTAGE HOSPITAL, ILFRACOMBE.—An X ray department has just been opened at this institution at a cost of £650.

MEDICAL NEWS

University of Cambridge.

On April 24th the following degrees were conferred:—

M.D.—H. V. Coverdale (*by proxy*), and G. K. Kirwan-Taylor.

M.B. & B.Chir.—M. A. Robertson, W. V. Howells, J. J. Keevil, I. B. Morris, and J. A. Pocock.

M.B.—Gwyn Rocyn-Jones.

B.Chir.—G. K. Kirwan-Taylor.

At recent examinations the following candidates were successful:—

DIPLOMA IN MEDICAL RADIOLOGY AND ELECTROLOGY.

Part I.—Gilbert Maclean, and W. S. C. Yuen.

Part II.—P. C. Basu, Samuel Bradbury, Isabella M. G. Butler, T. V. L. Crichlow, James Grieve, K. H. Hallam, Elfrida L. G. Hilton, C. C. Kapila, Ethel E A. Pepper, H. W. A. Post, Raseela Rekhi, F. P. Schofield, and I. C. C. Tchaperoff (*Cai*).

Royal College of Surgeons of England.

Six Hunterian lectures on Human Monsters and Malformations, illustrated by specimens from the museum, will be given by Sir Arthur Keith on Mondays, Wednesdays, and Fridays from May 4th at 5 P.M. (except on May 15th, when the time will be 4 P.M.).—In two lectures on experimental research at the Pasteur Institute, Coonoor, South India, Colonel Robert McCarrison, I.M.S., will describe diseases induced in animals by faulty nutrition and discuss the causation of urinary calculus in man and in cattle in India. These lectures will be given at 5 P.M. on May 18th and 20th.

West-End Hospital for Nervous Diseases.

Speaking at the annual meeting last week, Sir Leonard Brassey said that this hospital has for many years had the largest neurological out-patient department in the country. The report states that of all types of hospital there is none more literally national in its sphere, patients having been received last year from 33 out of 52 counties, as well as from overseas. The expenditure exceeded the income by £1771.

Bayliss-Starling Memorial Scholarship.

This scholarship, founded in memory of Sir William Bayliss and Prof. E. H. Starling, is tenable at University College, London, and is of the annual value of about £120, with exemption from tuition fees. The scholar will be required to follow a course of study approved by the Jodrell professor of physiology, involving a training in the principles of, and methods of research in, physiology and biochemistry. Candidates must apply to the secretary of the College not later than May 15th.

Society of Apothecaries.

A Livery dinner was held in the Hall of the Society of Apothecaries on Tuesday, April 28th, when Col. C. T. Samman, the Master, presided, supported by the Wardens, Col. E. C. Freeman and Dr. Cecil Wall. Mr. Arthur Greenwood, Minister of Health, was the principal guest.

After the loyal toasts Sir Stanley Hewett, Surgeon Apothecary to the King, was awarded the honorary diploma of the Society, and in presenting the new licentiate to the Master, Sir William Willcox made an interesting résumé of the history of the Society which extends now over 300 years, and referred to the fact that throughout that long expanse of time only two honorary diplomas had been granted by the Society, the holders being the present Prince of Wales and Sir John Lynn-Thomas.

The toast of the Civil Service was proposed by Mr. Greenwood, who took occasion to point out to the audience how deep was the debt owed by the public to the faithful servants of the State, whose duty it was to remain constant in their ideals of service while through political necessity being under the rule of successive different Ministers. In the course of his speech he made special reference to the difficult position in which public servants are placed when personally attacked in the papers because they have no right to reply. Here he was speaking not only of private complaints but of the utterances of politicians holding office and other public representative men who used the medium of the newspapers to attack a body who are unable to reply from the nature of their offices. He claimed for the British Civil Service a high position as a body of men who were capable, reliable, and honourable, and who spent their lives in the public weal. The toast was replied to by Sr. Arthur Robinson, the Secretary to the Ministry of Health.

The toast of the guests was proposed by Sir George Makins, and Sir John Bland-Sutton, Lord Ebbisham, and Mr. Whiteley, K.C., replied.

Royal Berkshire Hospital.

An appeal is being made for £30,000 to liquidate the debt on the Blagraves branch hospital, and it is calculated that a contribution of two shillings per head from the population of the county would provide this money. An amount has therefore been apportioned to each parish, solely on a population basis, and each unit is being asked to aim at this "target."

Perth Mental Hospital.

James Murray's Royal Mental Hospital, Perth, has just been extended by the erection of the Gilgal Hospital for the treatment of patients suffering from mild nervous and mental breakdowns. The wards, each of which has its private veranda and garden, provide for 40 patients. The hospital contains a certain quantity of antique furniture, and most of the rest has been made locally to the design of Dr. W. D. Chambers, the physician-superintendent.

Extension of Dunfermline Hospital.

Last week Sir Ralph Anstruther, Lord Lieutenant of Fifeshire, opened the completed extensions to the Dunfermline and West Fife Hospital. The old part of the hospital has been completely renovated and re-equipped, and a large out-patient department added, at a cost of £10,000. The nurses' home at Priory House has also been enlarged and improved.

The Booking of Out-patients.

The experiment of booking appointments for out-patients at the Manchester Jewish Hospital is reported to be a complete success. It is found that the doctors are never "held up" since any patient not in time loses his turn, and it is calculated that the patients' time is being saved at the rate of 200,000 hours a year. Inquiries as to the working of the scheme are being received from all parts of the world.

Excess of Out-patients.

Last year the patients admitted to the Norfolk and Norwich Hospital numbered 5973, an increase of 283 over the preceding year, and the largest on record. Their average stay was 19·4 days. The number of new out-patients—18,025—was fractionally smaller than in 1929. Attendances, however, increased from 87,572 to 93,029. The board of the hospital point out that the continued increase in the work of the out-patient department "is neither necessary nor desirable, as many of the patients now sent to the hospital could be effectively treated by their own medical attendants."

Memorial to William Smellie.

Last Saturday Prof. Munro Kerr unveiled the renovated memorial stone to Dr. William Smellie in St. Kentigern's Old Churchyard, Lanark. Dr. Haig Ferguson, President of the Royal College of Surgeons of Edinburgh, recalled that Smellie, who had been described as the greatest of British accoucheurs, died in 1763. Two years ago the Edinburgh and Glasgow Obstetrical Societies visited Lanark and agreed that it would be a fitting thing to renovate the tombstone as a tribute to the great man whose memory they desired to signalise and perpetuate. Prof. Munro Kerr related that Smellie was born in Lanark, was admitted a member of the Faculty of Physicians and Surgeons in Glasgow in 1733, and received the M.D. of Glasgow University in 1745. He had practised for 19 years in Lanark and then gone to London. Smellie was what would now be termed a great obstetric surgeon, and his case-records and writings could still be read with great interest and profit.

Rockefeller Medical Fellowships.

The Rockefeller Medical Fellowships for the academic year 1931–32 will shortly be awarded by the Medical Research Council, and applications should be lodged with the Council not later than June 1st. The Fellowships are provided from a fund with which the Council have been entrusted by the Foundation. Fellowships are awarded to graduates who have had some training in research work, in the primary sciences of medicine or in clinical medicine or surgery, and are likely to profit by a period of work at a university or other chosen centre in the United States before taking up positions for higher teaching or research in the British Isles. In special circumstances the Fellowships may be tenable at centres of research not in America. A Fellowship held in America will have the value of not less than £350 a year for a single Fellow, with extra allowance for a married Fellow, payable monthly in advance. Travelling expenses and some other allowances will be paid in addition. Full particulars and forms of application are obtainable from the Secretary, Medical Research Council, 38, Old Queen-street, London, S.W.1.

Collections at Glasgow.

The Glasgow university students collected the sum of no less than £15,070 for local charities on Jan. 17th of this year, and this was allocated last week by the students' representative council executive. The recipients of the largest amounts were the Royal, Western and Victoria Infirmaries, which each received over £2000; the Royal Maternity Hospital and Royal Hospital for Sick Children both received slightly less.

A Florentine Hospital.

The Ospedale di Camerator on one of the slopes of the Fiesole hills, which has developed from the American Hospital for Italian Wounded erected during the war, was opened recently. After the war the original hospital became a free dispensary for the scattered population of the Fiesole district, and later on a nursing home of ten beds was added. The new fully equipped hospital has men's, women's, and children's wards and a few private wards for paying patients with a total of 50 beds. It has hitherto been difficult in Florence to obtain accommodation for resident and travelling foreigners with nurses speaking their own language.

Medical Diary

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

TUESDAY, May 5th.—5.30 P.M., ORTHOPÆDICS. (Cases at 4.30 P.M.). Electin of Officers and Council.

WEDNESDAY.—5 P.M., HISTORY OF MEDICINE. Election of Officers and Council. Dr. George C. Peachey: Thomas Trapham, Cromwell's Surgeon, and Others. 8.30 P.M., SURGERY. Election of Officers and Council. Discussion: The Surgical Treatment of Simple Ulcers of the Body of the Stomach. Openers: Mr. A. J. Walton, Mr. G. Gordon-Taylor. Followed by Mr. Cecil A. Joll and others.

THURSDAY.—8 P.M., TROPICAL DISEASES AND PARASITOLOGY. Election of Officers and Council. Discussion: The Treatment of Amœbic Dysentery. Opener: Dr. P. Manson-Bahr. Other speakers will take part.

FRIDAY.—5.30 P.M., CLINICAL. (Cases at 4.30 P.M.) Election of Officers and Council. Mr. Cecil P. G. Wakeley: 1, Compound Comminuted Depressed Fracture of the Skull Five Years after Operation. 2. Intra-uterine Amputation of Left Leg in a Child. Dr. F. E. Saxby Willis: 3. Chronic Anæmia with Multiple Telangiectases. Other cases will be shown.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.

MONDAY, May 4th, and following WEDNESDAY and FRIDAY.—5 P.M., Sir Arthur Keith: Human Monsters and Malformations—illustrated by specimens.

ROYAL COLLEGE OF PHYSICIANS, Pall Mall East, S.W.

TUESDAY, May 5th.—5 P.M., Prof. Samson Wright: Certain Aspects of the Reflex Control of the Nervous System. First Oliver Sharpey Lecture.

THURSDAY.—5 P.M., Second Oliver Sharpey Lecture.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.

MONDAY, May 4th, to SATURDAY, May 9th.—MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W. M.R.C.P. SPECIAL COURSE. Tues., Dr. Roodhouse Glovne: The Histology of the Tuberculosis Lesion. Fri., Dr. Donald Hunter: Bone Growth and Metabolism. Medical Aspects of Diseases of Bones. 8.30 P.M.,—CENTRAL LONDON THROAT, NOSE, AND EAR HOSPITAL, Gray's Inn-road, W.C. Intensive Clinical Course.—INFANTS HOSPITAL, Vincent-square, S.W. Afternoon course. Second week.—MAUDSLEY HOSPITAL, Denmark-hill, S.E. Course in Psychological Medicine.—ST. JOHN'S HOSPITAL, Leicester-square, W.C. Afternoon and evening course. Lectures on four days in the week.—Further particulars from the Fellowship of Medicine.

SOUTH-WEST LONDON POST-GRADUATE ASSOCIATION, St. James's Hospital, Ouseley-road, Balham, S.W.

WEDNESDAY, May 6th.—4 P.M., Mr. V. Z. Cope: Demonstration of Surgical Cases.

LONDON SCHOOL OF DERMATOLOGY, St. John's Hospital, 49, Leicester-square, W.C.

MONDAY, May 4th.—5 P.M., Dr. S. E. Dore: Animal Parasites.

TUESDAY.—5 P.M., Dr. H. W. Barber: Alopecia Areata and Vitiligo.

THURSDAY.—5 P.M., Dr. A. C. Roxburgh: Differential Diagnosis of some Common Skin Diseases.

FRIDAY.—5 P.M., Dr. G. B. Dowling: Skin Diseases due to Protein Sensitisation.

ROYAL NORTHERN HOSPITAL, Holloway-road, N.
MONDAY, May 4th.—2.15 P.M., Mr. L. E. Barrington-Ward: Demonstration of Surgical Cases. 3.15 P.M., Mr. C. S. Lane-Roberts: Some Recent Advances in Obstetrics.
TUESDAY.—2.15 P.M., Mr. F. D. Saner: Selected Cases. 3.15 P.M., Dr. E. G. B. Calvert: Common Disorders of the Colon.
WEDNESDAY.—2.15 P.M., Dr. Bernard E. Schlesinger: Some Problems in Infant Feeding. 3.15 P.M., Dr. H. C. Semon: Demonstration of Cases.
THURSDAY.—2.15 P.M., Mr. G. G. Penman: Affections of the Lids. 3.15 P.M., Dr. Bruce Williamson: The Heart in General Practice.
FRIDAY.—2.15 P.M., Mr. A. M. Zamora: Demonstration and Discussion of Cases. 3.15 P.M., Dr. C. Gouldesbrough: Recent Experiences in the Treatment of Cancer by the "Activated Fluorescein" Method.

HAMPSTEAD GENERAL AND NORTH-WEST LONDON HOSPITAL.
WEDNESDAY, May 6th.—4 P.M., Mr. A. Sorsby: Headaches.

KING'S COLLEGE, Strand, W.C.
THURSDAY, May 7th, and following FRIDAY.—5.30 P.M., Prof. W. J. Dilling: The Pharmacology and Therapeutics of Lead Colloids.

UNIVERSITY COLLEGE, Gower-street, W.C.
THURSDAY, May 7th.—5 P.M., Dr. R. J. Lythgoe: Special Sense Physiology. (First of six lectures.)

WESTMINSTER HOSPITAL MEDICAL SCHOOL, 12, Caxton-street, S.W.
MONDAY, May 4th, and following TUESDAY.—5.30 P.M., Dr. Max Cheval: Treatment of Malignant Tumours by Radium Placed at a Distance.

LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE, Keppel-street, Gower-street, W.C.
MONDAY, May 4th.—5 P.M., Sir George Newman: The Rise of Preventive Medicine. (Heath Clark Lecture.)
TUESDAY.—2 P.M., Dr. C. F. White: Port Work. 5 P.M., Sir G. Newman: Second Heath Clark Lecture.
WEDNESDAY, THURSDAY, and FRIDAY.—5 P.M., Third, Fourth, and Fifth Heath Clark Lectures.
FRIDAY.—2 P.M., Dr. J. J. Buchan: Industrial Hygiene. The Rôle of the M.O.H.

UNIVERSITY OF BIRMINGHAM.
TUESDAY, May 5th.—3.30 P.M. (at the General Hospital), Dr. Stanley Barnes: Demonstration of Cases of Nervous Disease.
WEDNESDAY.—4 P.M. (in the Large Theatre of the Medical Faculty Buildings, Edmund-street.) Sir Hubert Bond: Some Correlations between General and Psychological Medicine. (First of five William Withering Memorial Lectures.)
FRIDAY (at the Queen's Hospital).—3.30 P.M., Mr. Bernard Ward: Cases Illustrating Problems of the Genito-Urinary Surgery.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE COURSE.
TUESDAY, May 5th.—4.15 P.M., Mr. J. Morley: The Indications for Local and Spinal Anæsthesia.
FRIDAY.—4.15 P.M., Dr. W. Dyson: Demonstration of Dermatological Cases.

MANCHESTER VICTORIA MEMORIAL JEWISH HOSPITAL, Elizabeth-street, Manchester.
WEDNESDAY, May 6th.—4.10 P.M., Mr. V. F. Lambert: The Surgical Treatment of Asthma.

Appointments

HUME, J. BASIL, M.S. LOND., F.R.C.S. Eng., has been appointed Assistant Surgeon to St. Bartholomew's Hospital.
WILKINSON, K. D., M.D., Ch.B. Birm., Consulting Physician to the Nuneaton General Hospital.
Certifying Surgeons under the Factory and Workshop Acts: FRANKS, J., L.R.C.P. Lond., M.R.C.S. Eng. (Winchester); FOURACRE, S. F., M.B., B.S. Lond. (Withernsea, Yorks); MAXWELL, L. B., M.B., Ch.B. Camb. (Sutton, Surrey); MACPHAIL, A., M.B., Ch.B. Aberd. (Stornoway, Ross); OWEN, L. E., L.R.C.P. Lond., M.R.C.S., Clynderwen, Pembroke).

Vacancies

For further information refer to the advertisement columns.

Ashton-under-Lyne District Infirmary.—H.S. At rate of £150.
Barrow-in-Furness, County Borough.—Asst. M.O. £500.
Belgrave Hospital for Children, 1, Clapham-road, S.W.—H.S. At rate of £100.
***Birkenhead General Hospital.*—H.P. £100.**
Birmingham City Babies Hospital, Maternity and Child Welfare Dept.—Jun. Res. M.O. At rate of £100.
Birmingham, Dudley-road, Hospital.—Jun. Asst. M.O.'s. Each at rate of £200.
Birmingham General Hospital.—Two Res. Anæsthetists. Each £120. Also Two Res. H.S.'s. Each £70.
Birmingham Queen's Hospital.—Cas. H.S. £70. Also H.P. for Midland Nerve Hospital. £70.
Birmingham University.—Tutor in Dental Clinical Subjects. £800.
Birmingham University, Faculty of Medicine.—Chair of Anatomy. £1100.
Bradford Royal Infirmary. H.P. and H.S. Each £150.
Brentwood, Essex County Mental Hosp.—Jun. Asst. M.O. £510.
Burnley, Victoria Hospital.—H.P. At rate of £150.
Cancer Hospital, Fulham-road, S.W.—Director of Research Inst.
Cardiff Royal Infirmary.—H.S. to Ophth. Dept. At rate of £75.
Chesterfield and North Derbyshire Royal Hospital.—Cas. O. At rate of £200.
Cheyne Hospital for Children, Cheyne-walk, Chelsea, S.W.—Hon. Surgeon for Diseases of the Throat, Nose, and Ear.
Constance-road Institution, East Dulwich, S.E.—Asst. M.O. £350.
Croydon County Borough, Mayday-road Hospital.—Res. Asst. M.O. £300.
Croydon, Mayday-road Hospital.—Res. Asst. M.O. £300.
East Ham County Borough.—Asst. M.O. £500.
East London Hospital for Children and Dispensary for Women, Shadwell, E.—Res. Cas. O. £125.
Gloucester, Gloucestershire Royal Infirmary.—2nd H.S. £120.
Great Yarmouth General Hospital.—H.S. £140.
Hackney Hospital, High-street, Homerton, E.—Temp. Asst. M.O. At rate of £250.
Hellingly, East Sussex County Mental Hospital.—Two Jun. Asst. Res. M.O.'s. Each £350.
Hong-Kong University, Faculty of Medicine.—Professor of Pathology. £1000.
Hospital for Epilepsy and Paralysis, Maida Vale, W.—Hon. Asst. Physician. Also two Med. Regs. Each £200.
Hospital for Sick Children, Great Ormond-street, W.C.—Ophth. Surgeon.
Hospital of St. John and St. Elizabeth, 60, Grove End-road, N.W. Res. H.P. At rate of £100.
Hull Municipal Maternity Home and Infants Hospital.—Jun. Res. M.O. £100.
***Hull Royal Infirmary.*—H.S. to Ophthal. and Ear, Nose and Throat Depts. At rate of £150.**
Ilford Borough.—Asst. M.O.H. £600.
Ilford, King George Hospital.—Two Hon. Anæsthetists. Each £50.
Kidderminster and District General Hospital.—H.S. £150.
Kingston-upon-Thames, Surrey County Mental Hospital.—Jun. Asst. M.O. £350.
Leeds General Infirmary.—H.S. to Radio Surg. Dept. At rate of £100.
Leeds Hospital for Women.—H.S. At rate of £50.
Leeds, Herzl Moser Hospital, Leopold-street.—R.M.O. £100.
Leicestershire and Rutland Mental Hospital, Nasborough, near Leicester.—Asst. M.O. £350.
Liverpool Eye and Ear Infirmary.—H.S. to Ophth. Dept. £100.
Liverpool Hahnemann Hospital, Hope-street.—Res. M.O. At rate of £100. Also Clin. Asst.
London Jewish Hospital, Stepney Green, E.—Med. Reg. £100. Surg. Reg. and Ear, Nose and Throat Reg. Each 60 guineas. Res. M.O. and Cas. O. Each at rate of £150. Also Jun. Res. M.O. At rate of £100.
London Hospital, E.—Asst. Phys. to Children's Dept.
Macclesfield General Infirmary.—2nd H.S. At rate of £150.
Manchester Ear Hospital, Grosvenor-square, All Saints.—H.S. At rate of £150.
Middlesex County Council.—District M.O. and Public Vaccinator for Parish of Harefield. £45.
Mile End Hospital, Bancroft-road, Mile End, E.—Temp. Asst. M.O. At rate of £250.
Newcastle-upon-Tyne, Hospital for Sick Children.—H.S. At rate of £100.
Newcastle-upon-Tyne, Royal Victoria Infirmary.—Hon. Surg. to Orthopædic Dept.
Norwich, Norfolk and Norwich Hospital.—Cas. O. and H.S. £120.
Oldham Royal Infirmary.—H.P. and Cas. O. Each at rate of £175.
Orford Eye Hospital.—H.S., £150.
Plymouth, South Devon and East Cornwall Hospital.—Res. Surg. O. and H.S. At rate of £150 and £100 respectively.
Poplar Hospital for Accidents, East India Dock-road, E.—Sen. Res. O. £200.
Radium Institute, Riding House-street, W.—H.S. At rate of £150.
Rochester, St. Bartholomew's Hospital.—Res. Surg. O. At rate of £225.
***Rotherham Hospital.*—H.P. £180. Cas. H.S. £150.**
Royal Chest Hospital, City-road, E.C.—Res. M.O. Also H.P. at rate of £150 and £100 respectively.
Royal Free Hospital, Gray's Inn-road, W.C.—Asst. M.O. for V.D. Dept. £350. Also Sen. Clin. Asst. for Infant Welfare Dept.
Royal Northern Hospital, Holloway, N.—H.S. At rate of £70.
St. Alfege's Hospital, 48, Vanburgh-hill, Greenwich, S.E.—Temp. Asst. M.O. At rate of £250.
St. Andrew's Hospital, Bow, E.—Temp. Asst. M.O. At rate of £250.
St. Bartholomew's Hospital, E.C.—Asst. Physician-Accoucheur.
St. Giles' Hospital, Brunswick-square, S.E.—Temp. Asst. M.O. At rate of £250.
St. James's Hospital, Ouseley-road, Balham, S.W.—Temp. Asst. M.O. At rate of £250.
St. Mary Abbott's Hospital, Marloes-road, Kensington, W.—Asst. M.O. £350.
St. Mary's Hospital for Women and Children, Plaistow, E.—Res. M.O. At rate of £175.
Sheffield Royal Infirmary.—Vacancy in Hon. Surgical Staff.
Stalybridge Borough.—M.O.H. £850.
Swansea General and Eye Hospital.—Cas. O. £200.
Taunton, Taunton and Somerset Hospital.—H.P. £100.
University College, W.C.—Bayliss-Starling Memorial Scholarships. £120.
Walsall Manor Hospital.—Jun. Res. Asst. M.O. £150.
West Bromwich, Hallam Hospital.—Res. H.S. £250.
Wigan Infirmary.—H.S. At rate of £150.
Worksop, Victoria Hospital.—H.S. At rate of £170.
Wrexham and East Denbighshire War Memorial Hospital.—Two Res. H.S.'s. Each at rate of £150.
York County Hospital.—H.S. £150.
The Chief Inspector of Factories announces a vacancy for a Certifying Factory Surgeon at Dalston (Cumberland).

NOTES, COMMENTS, AND ABSTRACTS

MAINTENANCE OF TUBERCLE-FREE HERDS OF MILCH COWS.

TWENTY-FIVE years' experience in Birmingham has shown[1] something of the difficulties experienced in the maintenance of tubercle-free herds. Breeders everywhere will be grateful to the Hannah Dairy Research Institute for its bulletin on this subject just issued.[2]

In the autumn of 1923 there were 16 producers of Certified or Grade A (T.T.) milk in Scotland, and in 1928 their number had increased to over 90. Information was supplied to the investigators by the owners of 96 herds, comprising, at the spring test of 1929, 3913 cows, of which 53, or 1·35 per cent., reacted. During the whole inquiry 28,221 official tests were recorded, of which 428 were positive. This represents an average annual loss of three reactors per 100 head of milking stock. Ideally, after the initial clearing of the herd, the subsequent percentage of reactors should be reduced to nil. In practice only 18 out of the 96 herds investigated attained this ideal. Among these 18, there were six herds comprising respectively 76, 28, 103, 30, 40, and 27 animals, which have had no reactor for six years.

CAUSE OF FAILURE.

With the help of the owners and the county veterinary officers, investigation was made into the probable cause of failure in the case of 462 reactors. and the conclusion reached that failure was due in 34 per cent. to infected stock purchased, which was supposed to be tubercle-free; in 24·5 per cent. to contact with other reactors or untested stock; in 11·5 per cent. to infection from contaminated premises and pastures; in 19 per cent. to miscellaneous and multiple sources of infection; in 4·5 per cent. to anomalous tuberculin tests; and in 6 per cent. they were unable to trace the source of infection.

HOW TO ENSURE SUCCESS.

In order to eliminate the main sources of infection in tuberculin-tested herds it is recommended that during the initial stage of clearing the herd a three-monthly test be adopted in order to limit the period of contact between tubercle-free animals and infected stock. The authors strongly advise the adoption of a uniform technique and the use of a standardised tuberculin, and suggest the double intradermal test as being of outstanding merit. All doubtful cases, they say, should be classed as reactors. They strongly urge that the herd should be maintained by breeding only, tubercle-free bulls being used for service. When occasional purchases have to be made they should not be made in the open market, and the veterinary surgeon, who gives the clean certificate, should also supply the history of the animal and of the conditions on the farm from which it is purchased, and whether there has been any opportunity for contact with non-tested animals. Precautions should also be taken for the transit of the new purchase, which should be isolated after its arrival until two confirmatory official tests have been made three months and six months respectively after arrival. The authors also make the suggestion that an agency for facilitating safe purchases might be undertaken by the Scottish Certified and Grade A (T.T.) Milk Producers Association.

PRECAUTIONS ON THE FARM.

To prevent the spread of infection on the farm itself the following precautions are suggested: (1) Drastic disinfection after reactors have been discovered, and the temporary isolation of cows in adjoining stalls. (2) Protection of the tubercle-free herd from pastures liable to be contaminated with infected manure. (3) Double fencing from fields in which untested stock are likely to graze. (4) If cattle are exhibited at shows they must be protected during transit and have separate accommodation at the show from that occupied by untested stock.

If all these recommendations had been carried out, it is estimated that 90 per cent. of the 462 reactors in the present inquiry would not have contracted infection. Even as it is, the occurrence of 3 per cent. of reactors is a source of irritating expense to the owners rather than of danger to the consumer, for it is hardly possible for a reactor to have reached the dangerous stage in the period between two six-monthly tests. The latter point is specially emphasised in the preface to the Bulletin by Dr. T. Drummond Shiels, M.P., chairman of the Research Grants Committee of the Empire Marketing Board, and receives confirmation from the fact that during 1927 and 1928, when the Glasgow hospitals were supplied with milk from tuberculin-tested herds, of 550 samples examined not one sample was found to be infected.

POINTS TO BE CLEARED UP.

There are some points as to which further research is needed. In the very early stages of infection there is a pre-sensitive period during which the tuberculin test is inadequate to diagnose infection. This period may last for eight weeks or more, and explains a few cases where a purchased animal, certified as a non-reactor, may react at the subsequent test. There are also cases in which an animal reacts to tuberculin at an early test, subsequently passes similar tests for years, and ultimately breaks down perhaps under a severe strain such as difficult calving. This temporary loss of reactivity is explained by the incapsulation of an old lesion. It is therefore important to exclude all animals, which have ever reacted, from tubercle-free herds. If a general scheme for eradication were adopted, it would be necessary and quite reasonable to enforce the branding of all reactors.

The Hannah Research Institute has published a very valuable survey of existing knowledge on this subject. Perhaps the principal change since the last decade of the nineteenth century is the recognition that a short exposure is all that may be necessary for the passage of infection from one animal to another. For example, Nocard in 1893 (Les tuberculoses animales) wrote that transmission only takes place as the result of an intimate and prolonged cohabitation, and that the sojourn in a common pasture may be looked upon as free from danger. The bulletin makes no reference to the possibility of infection from tuberculous pigs or poultry.

[1] THE LANCET, 1930, ii., 707.

[2] Reactors in Tuberculin-Tested (Licensed Herds) by Alexander B. Fowler, B.Sc. (Agric.), and Norman C. Wright, M.A., Ph.D. Bulletin No. 2. Price 2s. post free from the Secretary of the Hannah Dairy Research Institute, Auchincruive, Ayr.

EDUCATION AND ENTERTAINMENT FOR THE BLIND.

THE advantage of being able to read Braille is obvious to anyone who has imagined the state of blindness and its hardships. Instruction in this accomplishment is, of course, a fundamental part of work for the welfare of the blind and in cities it is a need which is met with fair success. In country districts, however, there may be only one instructor with a hundred or more charges in widely separate places. Often his visits are at intervals of over a month and between whiles the blind people easily forget their lessons and make little progress unless a relative or neighbour can give them frequent assist-

ance. This is not always easy, for the ordinary embossed lettering of Braille is by no means readily understood by would-be helpers, while reference to alphabetical lists and code books may make big demands on time and patience. With this in mind Dr. F. W. Alexander has set himself to construct keyboards which will simplify the task of the learner and also be a convenient guide to the amateur teacher. As at present constructed they consist of drawing boards on which the letters of the Braille alphabet are marked by round-headed nails. The signs of this alphabet, as is well known, are varying combinations of six points as on a domino, and on Dr. Alexander's board the sextet is always completed with small screws (nearly flush with the wood) so that the blind person can feel all six points and thus appreciate the relative positions of the Braille dots (round-headed nails). Against each Braille letter is its typewritten equivalent, for the benefit of sighted instructors, and the task of teaching is further simplified by the nail-heads being variously coloured according to whether the symbols are letters or word signs or abbreviations. These last are numerous in Braille, but a set of several boards will furnish the blind learner with all he needs, and will make it easy for anyone with sight to continue the work of an official instructor. Probably it will be found convenient to make the reference boards in other and cheaper materials, but some such "contraptions" (to use the inventor's word [1]) are likely to be of real service.

Having retired from the post of medical officer of health for Poplar, Dr. Alexander is now devoting his ingenuity to devising leisure occupations and games for the blind. He hopes to get amateur handicraft workers to help him in providing various kinds of puzzles, and he has shown us many samples which are well adapted to the amusement and interest of people who must rely on the sense of touch. The objective of many of them is to fit irregular flat pieces of wood or cardboard into geometrical figures, and for puzzles of this kind it is easy to supply a key consisting of similar pieces glued into position. It is surprising, however, to find how many other kinds of problem can be made to meet the requirements of the blind, and there are many games which they could play besides those already available to them. Dr. Alexander is to be congratulated on his well-directed efforts to fill a gap, and we hope he may find willing hands to carry out his plans.

MATERIALS OF BREAD-MAKING.

IN this country the problem of the proper composition of bread is not now acute as it was during the late war when wheaten flour had to be eked out with other cereals. But in Italy even at the present day a shortage of wheat has necessitated its admixture, with rice in the Vercellese, with rye in the Alto Adige, with maize in some parts of Lombardy, and with potato flour in part of Calabria. History records, says Prof. V. Ducceschi,[2] that the Romans generally ate wheaten bread, but in Galen and Pliny reference is also made to barley, maize, and rye bread. This was probably due to the neglect of the cultivation of wheat and the great prevalence of inferior cereals. Towards the end of the Middle Ages, however, wheat culture resumed its importance, and this fact, together with the introduction of maize, diminished the use of other materials for bread-making, while the cultivation of the potato in 1800 also had an influence in this direction. Prof. Ducceschi gives tables showing the percentage of protein, fat, starch, cellulose, salt, and water in wheat and other cereals, including potato and chestnut flour and soya bean. He concludes that every addition, except soya and milk powder, tends to deprive bread of the nutritive properties which characterise the classical food made from wheat. Certain economic considerations also come into account, and in Italy even if rice, rye and potato added in certain proportion make a good bread, this fact does not entirely compensate for the deficiency of wheat. For example, rice which makes a good mixed bread might be exported to purchase a much larger quantity of wheat. Of the various types of mixed bread, maize-flour does not contain gluten, and is, therefore, not well suited for breadmaking as it does not leaven easily and the bread after baking has little substance and softness. It is, on the other hand, rich in fatty material and therefore predisposed to change, acquiring a disagreeable smell and taste. But the addition of maize-flour up to a proportion of 10–15 per cent. does not unfavourably influence the physiological and hygienic qualities of the product thus obtained. The admixture of potato-flour to the extent of 20 per cent. is one of the most advantageous from a technical and hygienic point of view, but from the point of view of national economy must be judged on its own merits, since it may be better for the people to eat potatoes in the usual manner than to use them as an addition to wheat flour. The admixture of rye gives a dirty colour to the bread and is not to be recommended when the proportion of this cereal exceeds 10 per cent., in any case it should not be more than 30 per cent. As regards rice, the offal produced by polishing would certainly add a certain nutritive value to bread as it is rich in proteins and vitamins; recently the admixture of 5 to 10 per cent. of rice has given satisfactory results in some parts of Italy.

Investigations by Prof. Ducceschi on feeding with wheaten bread mixed with 10 per cent. of soya have shown that it is equal to that of bread made of the best wheaten flour alone, and with 20 per cent. is only slightly inferior as regards absorption, and content in nitrogenous substances, fats, and carbohydrates, and when the soya is deprived of fat an admixture of 10 to 20 per cent. to wheat flour is utilised by the human organism to the same extent as white bread made with the best wheat flour alone. The soya bean would acquire a greater importance than it has at present if it could be profitably cultivated, as may happen in Italy and especially in her colonies.

Experiments at Milan have shown that the addition of 1 kg. of milk powder (corresponding to about 8·5 litres of fresh milk) to every quintal of flour will produce a bread more nutritious than the ordinary kind—porous, homogeneous, well leavened, of good keeping qualities, and tasteful. Since 1 kg. of milk flour costs 6 lire, the price of the bread would be increased to a negligible extent by the addition.

Prof. Ducceschi concludes his paper by remarking that when Italy is self-sustaining as regards food, which is an important factor in political safety, it will perhaps be possible to leave out of consideration the question of breadmaking with mixed flour; but meanwhile it is prudent to be prepared for any event.

HOMER'S SURGEONS.

To the Editor of THE LANCET.

SIR,—I have read with great interest in THE LANCET Mr. Woods's article on the sons of Asklepios. The author does not mention Prof. O. Körner's new book on the medical knowledge in Homer (Die ärztlichen Kenntnisse in Ilias und Odysse, Munich, 1929). Speaking of Nestor's female slave Hekamede Mr. Woods declares her to be an apothecary, because she is said to know all the plants that grow on the earth, a statement which he thinks an exaggerated one. May I suggest that he makes here a confusion between Hekamede and Agamede, the widow of Mulius, whom Nestor had killed long ago in his youth so that she must have been a very old lady at the siege of Troy. Agamede is the Homeric form for Medea—hence her astounding knowledge of pharmacology.

I am, Sir, yours faithfully,

Berlin, April 24th, 1931. E. FULD.

[1] Dr. Alexander's account of early models will be found in the Medical Press and Circular for Dec. 10th, 1930.

[2] Arch. di Sci. Biol., 1931, xvi., 84.

SALUBRIDAD.

THE bulletin of the Mexican department of public health is appearing in a new form under the direction of the Service of Propaganda and Hygienic Education. An interesting article in the first number deals with the terribly insanitary state of the holy water in Catholic churches where worshippers repeatedly put their fingers or hands into the basins, kiss the images, and press their faces against the walls of the confessionals. Some of them are obviously suffering from the skin diseases so common in Mexico and hope to get cured by touching the images. Another article by Dr. Saucedo y Andrade, chief of the sanitary delegation in Tepic, gives an account of a skin disease called *el pinto* (probably the same word as *pintojo*, mottled) endemic in some parts of Mexico among the mestizos or half-bred population. *Pinto blanco*, the commonest form, is clearly a form of vitiligo, but the description of other forms such as *pinto color* (with excess of pigment), *escamosis* (scaly), and *plomizo* (lead coloured) suggests that several diseases are included in the one name and require careful sifting. The prevalence of rabies in Mexico is shown by a review of the successful results of inoculation on the lines suggested by Semple; only two out of 549 persons treated developed rabies and they were late in coming for treatment. The advantage of this carbolised vaccine is that it preserves its potency and is easily transportable. The remainder of the volume is taken up with official reports. Prof. Hoffmann, head of the bureau for biological investigation, reports on the rôle of the sinulidæ in the dissemination of onchocercosis. The impression gained from a study of this volume is the colossal task confronting the Mexican department of health, and the unrivalled field offered to the scientific investigator in every branch of medical inquiry.

NEW PREPARATIONS.

"WELLCOME" BRAND DIPHTHERIA PROPHYLACTIC T.A.F.—Diphtheria Prophylactic (Toxoid-Antitoxin Floccules), designed to produce active immunity, is prepared at the Wellcome Physiological Research Laboratories. When toxoid and antitoxin are mixed, floccules are formed which retain the immunising power of the toxoid. Removal of the supernatant liquid allows 99 per cent. of the nitrogenous bodies present in the broth after growth of the bacilli to be discarded, with a resultant diminution of the tendency of the preparation to cause undesirable reactions. With the low liability to cause reactions the preparation shows unusually high immunising power. It is issued in bottles of 1 c.cm. and 10 c.cm.

DISPERT PRODUCTS (Messrs. Coates and Cooper, 41, Great Tower-street, London, E.C.), acting as distributing agents for the manufactures of the Krause Medico-Gesellschaft, are introducing to the medical profession three of their preparations obtained by the Krause process of drug isolation. The samples sent include Digitalis Dispert, Pancreas Dispert, and Valerian Dispert, and each preparation can be employed in the conditions in which the name suggests that it has been found useful, the dosage being scientifically regulated by careful standardisation. The firm state that to medical men interested they will send samples of the products and a description of the Krause process.

We have also received from Messrs. Coates and Cooper a sample of IDOZAN, a preparation of iron with a good history behind it, for it was placed on the market nine or ten years ago (THE LANCET, 1922, ii., 1283) by the firm of Charles Zimmermann and Co. It is now distributed by Messrs. Coates and Cooper.

BYNO-EUGASTROL (Messrs. Allen and Hanburys, Ltd., Bethnal Green, London, E.) is a concentrated extract of hog's stomach presented in a palatable and assimilable form, the antianæmic and blood regenerative principles of the gastric tissue being provided in combination with liquid malt. The preparation is made up in 4, 10, and 20 oz. bottles, and three tablespoonfuls represent an amount of extract equivalent to 100 g. of fresh stomach tissue. This is the usually recommended daily dose, though it will vary, of course, in accordance with the response of the patient and the directions of the medical man. As happens in the liver treatment of anæmia, the course may have to be indefinitely persevered in, but daily administration is not necessary after the anæmia has disappeared.

LACTOGEN (Nestlé and Anglo-Swiss Condensed Milk Co., 6 and 8, Eastcheap, London, E.C.), modified dried full cream milk, is supplied in tins which contain the equivalent of four pints of milk with milk-sugar added. The recommendations for infant feeding are set out in tabular form in accordance with the age of the infant, and the warning is appended to the table that dilutions do not necessarily produce fluids of the equivalent composition of normal milk. Lactogen, though designed mainly as an infant food, is also recommended as a properly constituted milk diet for invalids and convalescents, the manufacturers claiming that it is not merely a dried milk powder but that it is specially prepared to obtain proper physiological balance. Thus the addition of carbohydrate to the cream enriched fresh milk corrects a natural deficiency, while reducing the excess of protein. The addition of fresh fruit or vegetable juice is recommended, as supplying a needed accessory food factor.

NEOTROPIN (Messrs. Schering, Ltd., 3, Lloyd's-avenue, London, E.C.) is a urinary antiseptic for oral administration, its chemical composition being butyl oxydiamino-azo-pyridin. The manufacturers supply details of the procedure they have adopted for testing the bacteriological efficacy of the drug, and state that its use has proved considerable as a disinfectant of the urinary tract prior to surgical interference or in the post-operative treatment of surgical cases and in gonorrhœal affections.

BOTOL (Continental Laboratories, Ltd., 30, Marsham-street, London, S.W.).—This preparation consists of bromoform combined with codeine aconite, and belladonna, and is recommended for pertussis and spasmodic or convulsive coughs. The preparation is supplied in tablet form, and should not be employed save under medical directions, but in suitable cases would be valuable.

Births, Marriages, and Deaths

BIRTHS.

BATTERSBY.—On April 18th, the wife of F. J. G. Battersby, of The Tower House, Malmesbury, Wilts., of a son.

LINDUP.—On April 15th, at Floriana Malta, the wife of Flight Lieut. C. A. Lindup, R.A.F. Medical Service, of a daughter.

MILLOY.—On April 23rd, at Wilbraham-place, S.W., the wife of John M. Milloy, M.B., F.R.C.S., of a son.

SEWARD.—On April 24th, at Southerhay West, Exeter, the wife of Charles Seward, M.D., M.R.C.P., of a daughter.

URWICK.—On April 21st, at Park-street, W., to Violet, wife of Dr. Desmond Urwick—a daughter.

MARRIAGES.

GOODWIN—CLAYTON.—On April 24th, at St. Mark's Church, Hamilton-terrace, N.W., Aubrey Goodwin, O.B.E., M.D., F.R.C.S., to Hilary, youngest daughter of Mr. and Mrs. C.E.H. Clayton, of Ruislip.

MARSHALL—BROWNE.—On April 23rd, at St. Saviour's Church, Warwick-avenue, W., Charles Wallace Marshall, M.D., to Helen Marion ("Gipsy") Browne, M.B., B.S.

DEATHS.

BEGG.—On April 21st, Charles Begg, M.B., C.M. (Edin.), in his 80th year.

BRAMWELL.—On April 27th, at Heriot-row, Edinburgh, Sir Byrom Bramwell, M.D., LL.D., D.C.L., in his 84th year.

KAY.—On April 22nd, suddenly, in London, Walter Smith Kay, M.D., of Harrogate, late Medical Superintendent of West Riding Mental Hospital, Wadsley, Sheffield.

TYRRELL.—On April 21st, in a nursing home, Walter Tyrrell, M.R.C.S., L.R.C.P., of Kensington Court-gardens.

WELSFORD.—On April 20th, in Rome, Arthur Gerald Welsford, M.D., F.R.C.S., aged 66.

YOUNG.—On April 25th, at King's College Hospital, after an operation, Colonel James Young, M.D., T.D., D.L., aged 65.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.